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THE IRON AGE

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THE IRON AGE

NOVEMBER 23, 1939

Vol. 144, No. 21

Will Grandpa's Rejuvenation Last?

ONCE upon a time there was an old gentleman who had time on his hands. Time enough on them to enable him to do a good job of thinking about his infirmities. He thought and thought about them until, in his mind, he became possessed of most of the ills listed in Doctor Ayer's Almanac. His legs bothered him, his back ached, he heard buzzing sounds in his ears and he suffered from indigestion and palpitation of the heart.

One day as he was tottering down the sunny side of the street, taking his constitutional, grandpa happened to find himself right at the scene of a gangster fight at the moment that hostilities began. Bullets flew in every direction, some of them coming too close to the old gentleman to be comfortable. Dropping his cane and eyeglasses, he departed from the scene of conflict with all of the celerity and agility of flaming youth. Some observers say that he made the 100 yards to the nearest corner in ten seconds flat!

The excitement seemed to do grandpa a lot of good. For some time after the event he had a new lease on life, forgot his pains and aches and went back to business. "Guess all I needed," said he, "was something to take my mind off my troubles."

The record does not reveal whether grandpa's rejuvenation was temporary, or lasted the rest of his life. Personally, I believe that it was temporary; that in time the stimulation wore off and the aches and pains returned. I would think that a lasting cure would have to be based on something more fundamental than the shock of excitement, unless his troubles were all imaginary, which was unlikely in one of his age.

I think of this story of grandpa, sometimes, in connection with the sudden stimulation that has been given to American business because of the war abroad.

Here is American business, which has been halting and hobbling along, full of aches and pains for seven or eight years, suddenly doing the hundred yards in ten seconds flat at the sound of gunfire. Can it be that this sort of performance will lead to a sound and enduring recovery?

Insofar as our troubles were imaginary, they can be removed, perhaps, by diverting our minds from them. But unemployment is not imaginary, a forty billion National debt is not imaginary, pyramiding taxes are not imaginary, the farm problem is not imaginary and attempts to change us from a constitutional democracy to a regimented dictatorship are not imaginary. You can't laugh them off by declaring an armistice on past mistakes and present troubles.

Unless, while the patient is feeling well, we operate on some of these chronic continuing troubles, they may return to plague us after the shooting is over.

J. H. Wainwright,

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Doing Business Under Hitler

By FELIX BEYER

EDITOR'S NOTE—Mr. Beyer, the German economist who wrote "The Coming Collapse of German Industry," for the Oct. 12 issue of THE IRON AGE, this week describes some of the troubles of the business man in Hitler Germany which, he says, still has a capitalist system, of a sort. Mr. Beyer, who is not a political refugee, presents his picture of political control of German industry without attempting to draw a parallel with the situation facing business men in the United States.

GERMANY still has a capitalistic system of a sort, and at the outbreak of the war its business men were struggling to preserve what remained of this system against the overwhelming pressure of a dictatorship.

With each step forward, however, the German business man found himself pushed back two steps by a government which insisted on ever greater control of the means of production. He vaguely remembered that National Socialism was once considered a cure for a social disease called Communism and observed recently, with some misgivings, that the Hitler government has decided, in dealing with the Soviets, that for the first time in history the cure and the disease

were going to try to live in the same bottle.

Still, however, the political leaders of the Nazi regime have paid lip service to the system of private enterprise, publicly praising such leaders of German industry as Krupp von Bohlen und Halbach, Thyssen, Bosch and the late Emil Kirdorff. Such men as these have been appointed to high government offices where they gave the regime an impressive front of economic stability. Back of this front there is, for American industry, an interesting picture.

No Room for Newcomers

If you want to establish a business in Germany the chances are a hundred to one that you would find such a move

impossible even if you have sufficient capital. With few exceptions every branch of industry or commerce is closed to newcomers. There exists for every industry a so-called Errichtungsverbot (establishment prohibition) which is coupled with a prohibition to enlarge an existing firm. Permission to establish a new firm or enlarge an old one is granted only if this is "in the national interest" or what is often the same thing, if a National Socialist Party official or a high-ranking member stands to profit by establishment of the new firm.

Even the man who wishes to establish a grocery store or shoe repair shop has his difficulties. The "Retail Law" and "Handicraft Code" provide that a food store proprietor or a cobbler must have sufficient professional qualification and be politically reliable, evidence of which must be shown before an examination committee. These examinations have become instruments of monopoly for the Nazis. Many thousands of small retail shops and businesses have been put out of business and the owners advised to seek work on government projects as

their independent existence is no aid to the Nazi war machine, and the war industries need skilled workers.

A Lack of Trained Men

Such a suppression of free competition has led to rapid depletion in the number of capable executives and business leaders. Party nepotism is general. A Nazi party member, with influence, lives in a paradise with other party members who "have the golden key" and who form the class which has benefited most from the Hitlerization of Germany.

Certain party members and high officials have increased their fortunes manifold out of the anti-Jewish measures which deprived Jewish owners of their enterprises. One of the most elegant department stores in Germany was acquired by a minor official of a municipal chamber of commerce (chambers of commerce have semi-governmental status in the Reich). This official, who had influence in the party and believed himself entitled to spoils, did not purchase the department store with his own funds. He borrowed money from the Labor Front, which is the Government Labor organization which collects dues from all German workers. With this money he bought some real estate which he knew he could sell to the Army at a great profit. With his profits he bought the department store. Similarly, a banker recently acquired a textile factory and a watchmaker "muscled in" on a shoe plant. Clerks with no other qualification than influence in the party took over the plant of their employers with the aid of a Labor Front or bank loan. The Labor Front has, however, also gone into business on its own and among other enterprises owns a chain of restaurants including the "Kempinski."

Politicians Become Owners

EXPROPRIATION of industries in Germany has not been limited to Jewish firms. Many profitable firms have run afoul of government regulations, have been taken away from their owners, and now are run by government commissioners who in most instances are digging themselves into actual ownership. This is true particularly of large firms in former Austria and Czechoslovakia. Firms like the Alpine Montanwerke, largest Austrian producer, and Steyr have managing boards with a majority of Nazi officials and party officers from old Germany.

You cannot hire a worker without the permission of the local employment agency, the district labor governor

(Trustee of Labor), the Labor Front or the Army. You cannot fire the worker without permission nor can the poor fellow leave you in order to get a better job. You may have no raw materials and nothing to do but you cannot release your workers. You just continue paying wages. Probably you cannot lay off the workers, even if you received permission, because if they are skilled workers you will never see them again. Some plants lost 10 to 20 per cent of their workers to the Government for fortification (Siegfried line) work.

The question of labor is not alone complicated by the question of labor supply but by the high degree of insecurity in the relations between worker and employer. In every plant there is at least one political representative of the Labor Front. Besides, there is a board of shop stewards or representatives of the workers. The employer is not, as in the United States and Great Britain, faced with definite wage and hour problems. These problems do not officially exist as the Government regulates both hours and wages. The employer therefore never clearly knows what his workers actually want.

No Peace When Unions End

The abolition of trade unionism in Germany has not brought labor peace but instead has been supplanted by intrigue. The conference table has made way to a conspiracy. Sabotage and slow-up strikes have become important weapons of the workers. The shop stewards try to give the needs of the workers legitimate expression. But this is not an easy matter as the employer's hands are also tied. Here again the state and the party represented by the District Labor Governor, the Employment Agency and the Labor Front are in on the deal.

It may be pointed out that the Labor Front Representative (Betriebsobmann) in a plant constitutes a particular menace. He often sees himself as the boss of the future and is constantly on the lookout for lack of national socialist enthusiasm on the part of the employer. A political joke told at the wrong moment may land the employer in the concentration camp and the Labor Front representative in the swivel chair of the boss. There are many such cases.

However, these Labor Front Representatives can also be the boss' best friend. It may sometimes cost something but, from a wholly materialistic viewpoint, it is a worthwhile investment. Very often the employer is

forced to contribute to some special fund for alleged violations of wage and hour regulations or even for having reprovoked an employee. In one case an employer had to promise to give each of his employees one of the cheap small motor cars which are to be produced by the Labor Front sometime in 1942 or later. This was not profitable for the employer and it did not help the workers much but it is a gain for the Labor Front which has a staff of some hundred thousand paid functionaries. "Voluntary" subscription to and paid advertisements in Labor Front and Nazi magazines are also highly profitable.

Red Tape Like Steel Wire

THERE is not a single action of a German business man that is not hampered by a red tape of steel-wire like tenacity. Daily he must fight for his raw materials. He must run down to the competent government raw ma-



terial control office of which there are some 28 and talk or bribe the official into granting him at least a part of what is due to him. Usually a plant's theoretical raw material supply is a fixed percentage of the consumption during a previous key year. These percentages are lowered from month to month. Furthermore the deliveries of raw material depend on the importance of the order for which they are needed for the national defense program. However, big firms that can maintain their own lobbies and contact men at the raw material control bureau, and ministries and firms that have good and sometimes very expensive connections, receive preferential treatment. Many a minor official in such a bureau has been able to buy a comfortable villa and to pad an otherwise insignificant salary with "special" income.

The shortage of raw materials has disastrous results from the viewpoint

of industrial efficiency since lack of a few kilograms of a special alloy can halt production on a large project. It is, however, not alone the raw material shortage itself which constitutes a burden to the industrialist. With the administration of raw materials is connected an unbelievable volume of office work.

Steel Figures Every Week

Forms must be filled out from the Government Control offices that show the consumption of every raw material during a certain key period on which present allotments are based. The key periods are different for every raw material. Separate figures must be submitted for materials used in exported goods. Figures must be submitted every month and in certain cases (iron-steel) every week with regard to actual consumption at present and the amount needed for future orders.

Statistics regarding future deliveries

must be subdivided into different categories, viz., orders from the army, orders from firms working for the army, orders for enterprises working in the national interest, orders for export, orders for the four-year plan, orders from the German railroads, Government Building projects, etc., etc. Stocks of raw materials and fuels (in particular oil and gas) and semi-finished products must be reported monthly on special forms. Any important changes must be reported immediately. No hoarding or even the keeping of slightly above normal stocks is permitted and excess stocks must be offered to the Government. Heavy fines and prison sentences are threatened those who dare to disobey the Government's raw material regulations or do not fill out a statistical form sheet. There is a new regulation or form sheet nearly every day. Industrial accidents whether important or not must be reported by

(CONTINUED ON PAGE 78)



Control of SULPHUR IN BASIC OPEN HEARTH

By T. L. JOSEPH and F. W. SCOTT*

CONSUMER requirements have undergone fundamental changes in recent years and consequently the steel industry has spent huge sums of money for costly equipment to meet these demands. The increasing production of flat rolled products has led to the building of a number of hot and cold strip mills, which have, at present, an annual capacity in excess of 15,000,000 gross tons. Furthermore, consumer demand for better and more uniform physical properties, particularly deep drawing qualities, have necessitated exacting control during the hot and cold finishing manufacturing operations.

The motor car industry, the largest steel consuming group, demands uniform quality and large sheets having extra deep drawing properties. These large sheets, necessitated by the production of all-steel bodies and tops, require the use of larger ingots than were formerly standard in sheet production. And, in turn, the more pronounced segregation of metalloids in these larger ingots adds to the difficulty of maintaining uniformity of product.

Rimmed Steel Desirable

Practically all the sheet used for deep drawing is rimming steel. The

*Professor of metallurgy and instructor in metallurgy respectively University of Minnesota.

ALTHOUGH the general effect of non-metallic inclusions on the physical properties of steels has been frequently discussed, little in the way of quantitative work on the specific effects of these inclusions has been reported. This article makes a comprehensive contribution along this line. In this, the first section of a three-part article, data are given regarding the inclusions found in slabs and rejected sheets.

surface of the sheet comes from the rim of the ingot. This rim of pure metal is produced by the evolution of gas which cleanses the surfaces of growing crystals during the solidification of the ingot. Because it is clean and relatively low in metalloids, the rim is very ductile and capable of taking a high finish in the cold strip mill. However, it surrounds a zone high in metalloids, due to segregation from the rim. This zone of liquidation is greater at the top-center of the ingot than in any other position, at which point the carbon, manganese, phosphorus, and sulphur are present in the maximum amounts, causing the sheet to be least ductile. Because of this segregation, the top portion (nearly one-third) of each ingot must either be remelted or applied on orders having low ductility requirements. Either practice, however, adds to the cost of manufacture.

Of all the metalloids, the segregation of sulphur is perhaps the most

marked and may have very detrimental effects. Sulphur segregates as the sulphides of iron and manganese and may produce long stringers of inclusions in rolled steel. While mostly manganese sulphide, these non-metallic inclusions also contain certain amounts of iron and manganese oxides, and are often associated with silica and alumina. Such steel is microscopically dirty, has poor drawing properties due to the long non-metallic stringers, and is often said to be laminated.

Much has been written regarding the general effect of non-metallic inclusions on the physical properties of steel. However, little quantitative work has been reported regarding the specific effects of these inclusions. In view of the limited information on the effect and composition of these non-metallic particles in rimming steel, a number of studies were made. Two of these will be described: First, a quantitative identification of the non-metallic inclusions in a slab and second, the

TABLE I
Quantitative Identification of Non-Metallic Inclusions in Slab of Strip Mill Steel

SKIN SAMPLE				
Test No.	1	2	3	Average Per Cent
SiO ₂	0.0000	0.0044	0.0029	0.0024
Al ₂ O ₃	0.0088	0.0113	0.0080	0.0094
FeO	0.0473	0.0262	0.0341	0.0359
MnO	0.0027	0.0033	0.0024	0.0027
FeS	0.0200	*	0.0385	0.0293
MnS	0.0112	*	0.0056	0.0084
Total average non-metallic inclusions (Per Cent) = 0.0881.				
Oxide sulphide ratio = 1.337.				

JUNCTURE SAMPLE						
Test No.	1	2	3	4	5	Average (Per Cent)
SiO ₂	0.0013	0.0010	0.0020	0.0033	0.0000	0.0017
Al ₂ O ₃	0.0048	0.0044	0.0045	0.0045	0.0038	0.0044
FeO	0.0203	0.0272	0.0210	0.0196	0.0558	0.0288
MnO	0.0033	0.0043	0.0038	0.0014	0.0067	0.0039
FeS	0.0577	*	0.0192	0.0385	*	0.0385
MnS	0.0248	*	0.0372	0.0352	*	0.0324
Total average non-metallic inclusions (Per Cent) = 0.1097.						
Oxide sulphide ratio = 0.547.						

CENTER SAMPLE						
Test No.	1	2	3	4	5	Average (Per Cent)
SiO ₂	0.0004	0.0008	0.0017	0.0046	0.0039	0.0023
Al ₂ O ₃	0.0030	0.0032	0.0034	0.0055	0.0013	0.0035
FeO	0.0483	0.0154	0.0476	0.0470	0.0471	0.0411
MnO	0.0022	0.0036	0.0026	0.0030	0.0013	0.0026
FeS	0.0385	0.0659	0.0797	0.0577	0.0687	0.0621
MnS	0.0179	0.0136	0.0108	0.0275	0.0105	0.0161
Total average non-metallic inclusions (Per Cent) = 0.1277.						
Oxide sulphide ratio = 0.633.						

* Not determined.

TABLE II
OXIDE ANALYSIS OF STEEL SHEET REJECTED BECAUSE OF LAMINATIONS

	Sample No. 1 (Per Cent)	Sample No. 2 (Per Cent)
SiO ₂	0.0130	0.0042
Al ₂ O ₃	0.0284	0.0150
FeO	0.0401	0.0117
MnO	0.0414	0.0118
Total oxides = 0.1229 per cent		0.0427 per cent

quantitative determination of the non-metallic inclusions in two samples of steel sheet rejected by a consumer.

Structure of Rimmed Ingot

The structure of an ingot of rimmed steel is shown in Fig. 1. The cross-section of a 24 x 43 in. ingot was obtained by splitting on a plane through the center line and parallel to the 24-in. side. Holes in which the dynamite was placed appear in the upper part of the figure. An ingot of rimming

¹G. R. Fitterer, B. E. Sockman, E. A. Knickerbocker, R. B. Meneilly, E. W. Marshall, Jr., and J. F. Eickel: "The Development of an Electrolytic Method for the Determination of Inclusions in Plain-Carbon Steels," U. S. Bureau of Mines, R. I. 3205.

steel may be seen to consist of four distinct zones as follows:

(1) A very thin skin (A) of quickly chilled steel of approximately the same composition as the ladle test.

(2) Adjacent to this skin is the rim zone (A-B) of high purity steel which may contain pencil-like blowholes normal to the ingot surface. These are usually called primary blowholes because they are first to form during solidification of the ingot.

(3) A narrow zone (B-C) of comparatively impure material associated with blowholes of globular form, called secondary or intermediate holes. This zone is of particular interest as

many steel failures occur at this point, due to laminations.

(4) The central portion (C-E) or the core consists of material less pure and less uniform in composition. In this zone of maximum segregation the most impure metal is at the top. Globular blowholes, known as central holes, are scattered throughout this area.

Inclusions in Slab

The positions of the samples that were taken from a strip mill slab for oxide and sulphide determinations are shown diagrammatically in Fig. 2. A short cross-section of the slab from the center of an ingot was sheared off, machined, and etched to observe the macro-structure. From the etched surface, zones 2, 3, and 4 were located. Zone 3 was identified as a narrow line, and as it had been the secondary blow-hole zone, was the juncture of zones 2 and 4. Zone 1 was not determinable but zone 2 with a very dense structure uniformly etched extended to the surface. Being the center of the slab, the position of zone 4 was easily determined. It was deeply etched. Sections about 1/2 in. thick were cut from the three zones as indicated in Fig. 2. For identification they were labeled "skin" for zone 2, "juncture" for zone 3, and "center" for zone 4. The appearance of these longitudinal sections after etching is shown in Fig. 3. The distortion was due to the shear drag during the cutting at the slabbing mill.

These longitudinal sections were further cut, as shown in Fig. 3, into pieces suitable for oxide and sulphide analysis. Each piece was analyzed separately. The oxide analysis was made according to the electrolytic iodine extraction method, and the sulphides calculated from a determination of the total sulphur present according to the method of G. R. Fitterer.¹ While this method may not be exact, the results give some indication of the distribution of sulphides. The oxide and sulphide analyses are given in Table I.

The analyses of the non-metallic inclusions in the strip mill slab show that the patterns developed during deep etching are associated with the high sulphur areas. The included matter, principally iron and manganese sulphide, was extremely high at the juncture. Due to the fact that the juncture is a narrow line in the slab, the sample analyzed contained a portion of the skin, some of the center, and the line of greatest segregation. The average sulphide content of the juncture is 0.071 per cent, compared with 0.038 per cent in the skin zone, and

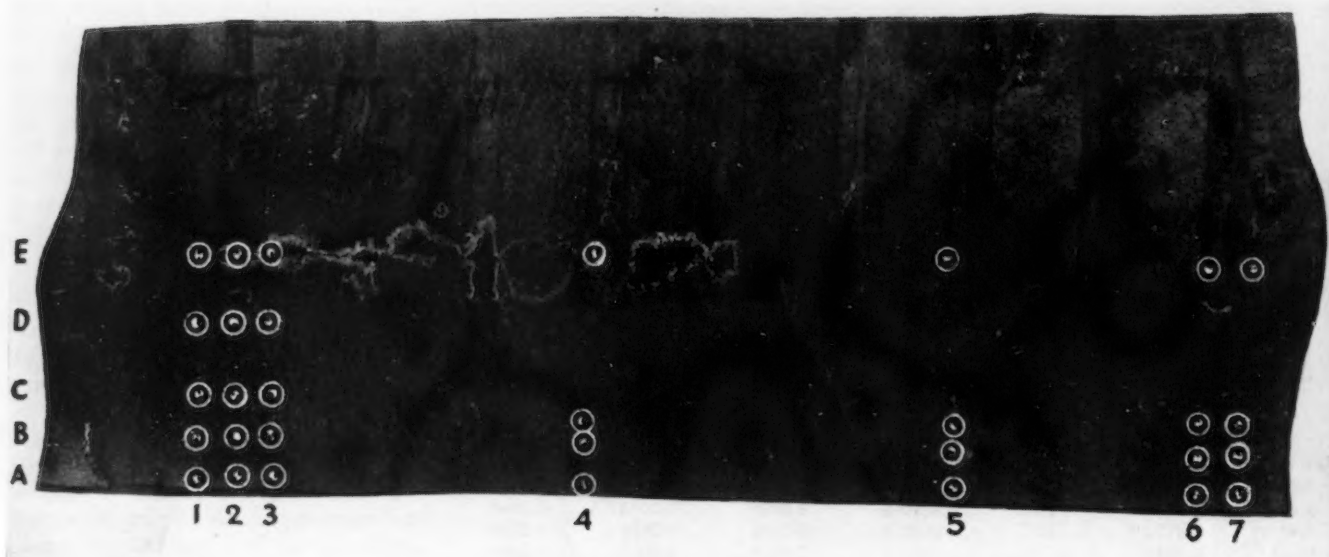


FIG. 1 — Cross-section structure of rimmed ingot. Numbers and letters refer to sampling positions for sulphur analyses.

0.080 per cent in the center zone. Thus, these average figures indicate the juncture is a thin film of extremely impure material, and probably is conducive to steel failures at this point.

Failures observed in the secondary blowhole region could be caused by the occurrence of these holes and impure material in the same narrow zone. During the rimming action, the liquid non-metallic material is rejected from the skin and forms a very impure layer just in front of the solidifying metal. The capping of the ingot, or any outside change of conditions, may alter the solidifying process trapping these inclusions and gases. The gases form blowholes into which the liquid iron - manganese - oxy - sulphides are forced, and the presence of these impurities in these blowholes may first

cause poor welding during the subsequent rolling. Furthermore, a weak spot thus produced may cause failure during the forming operations on the finished product.

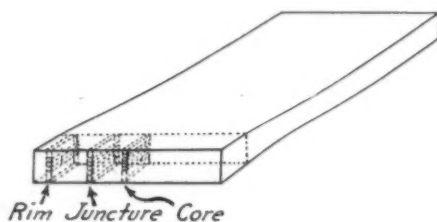
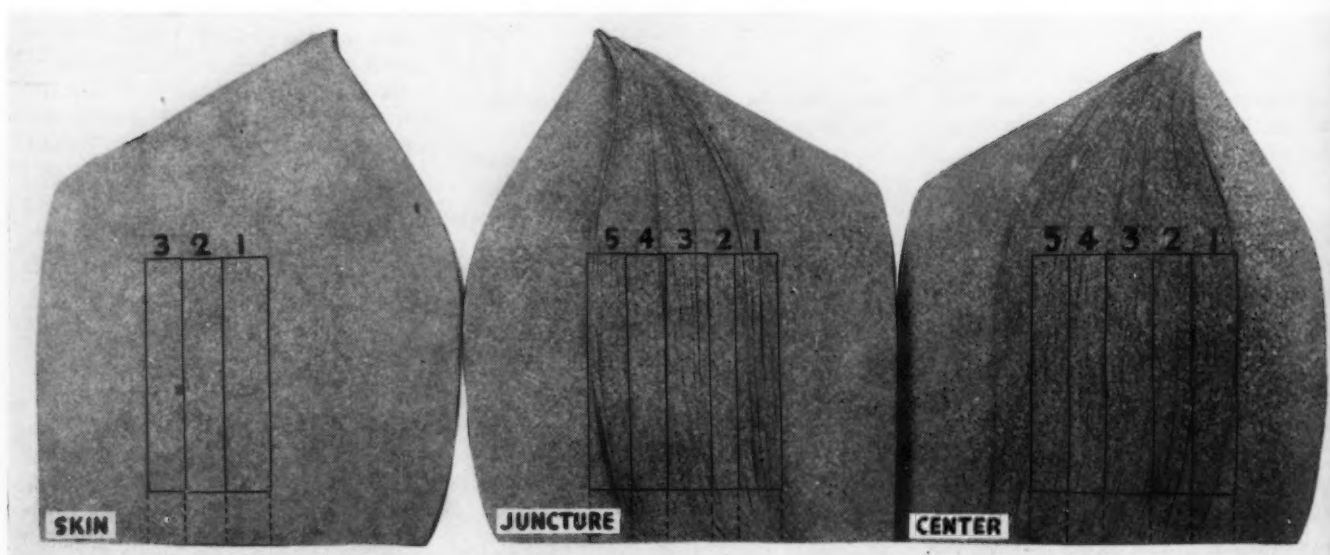


FIG. 2 — Diagrammatic sketch showing positions of samples for oxide and sulphide analyses in slab.

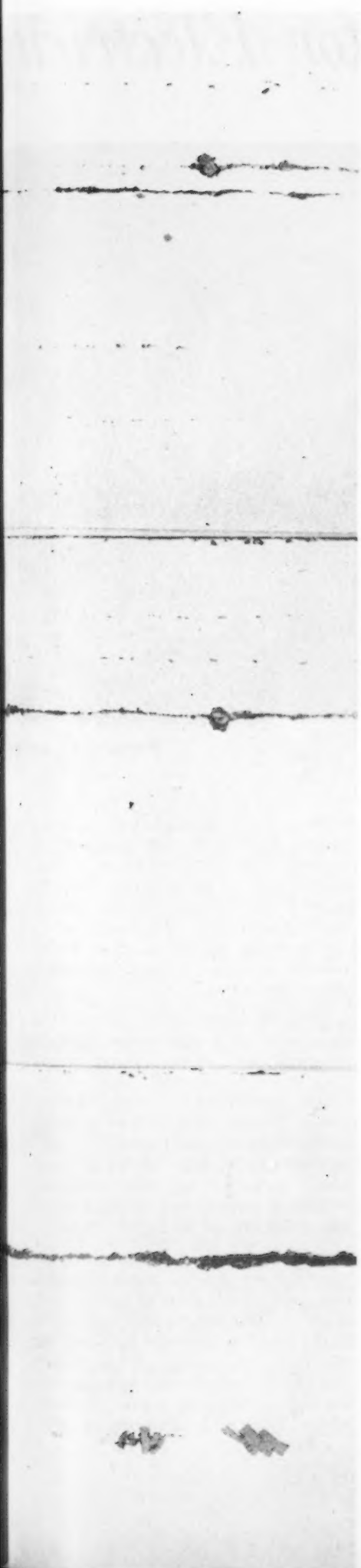
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BELOW

FIG. 3 — Sections of strip mill slab, deep etched, showing positions of samples used for non-metallic inclusion analyses.



Inclusions in Rejected Sheets

The conditions just described resulted in the rejection of a number of steel sheets due to non-metallic inclusions occurring as stringers. Samples from two such rejected sheets were examined for inclusions. The results are shown in Figs. 4 to 9 inclusive. Figs. 4, 5, and 6, taken at random from sample No. 1, represent the average condition of the sheet. Figs. 7, 8, and 9 represent sample No. 2. Both samples are carbon strip mill sheet 0.045 in. thick. The oxide analyses of the two samples are given in Table II.



Metallographic methods of inclusion identification indicated that these stringers contained considerable sulphide compounds. Crystalline inclusions with well defined edges occur here and there in the stringers, and these presumably are some of the oxides.

Sample No. 1 contains extraordinary amounts of oxides, while sample No. 2 is nearly normal. Sample No. 2 was, however, also defective. The heavy segregate was clearly defined in the position of the secondary blowhole zone in sample No. 1. Although less clearly defined, it was similarly located in sample No. 2. Sample No. 2 appears to have come from a position nearer the bottom of the ingot. When such stringers occur, the ductility and quality of the steel are lowered.

The continuity of the inclusion is influenced by its softening and melting points. A high sulphur content increases the tendency for the inclusions to form stringers, because of the low melting point of the oxy-sulphide material.

Ed. Note: Next week the authors continue with information on the effect of sulphur on grain size and physical properties of strip steel, and sources of sulphur in the basic open hearth.

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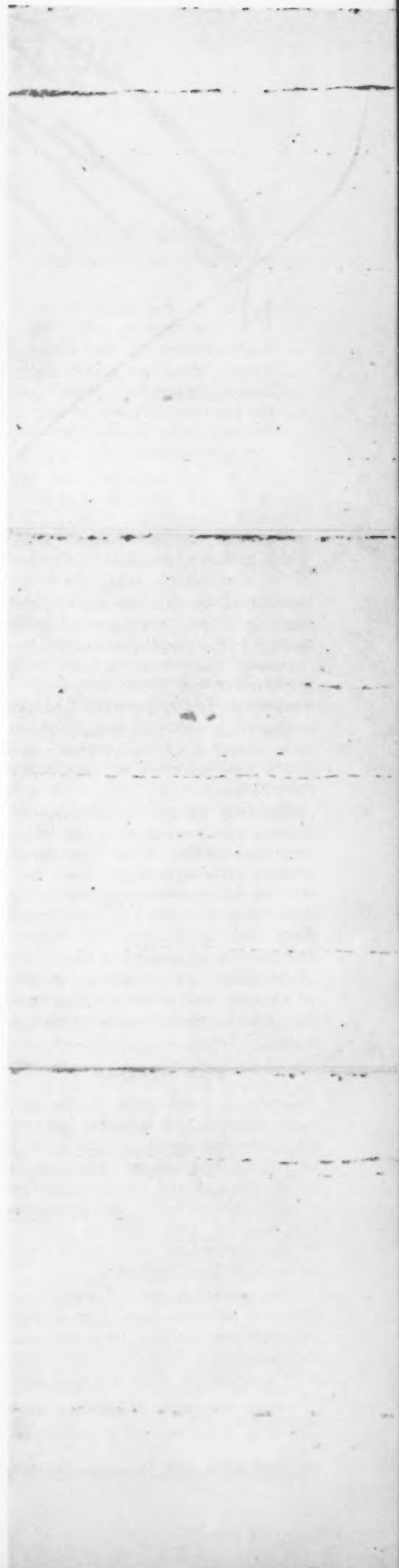
AT LEFT

FIGS. 4 (top), 5 (center), and 6 (bottom)—Photomicrographs showing typical inclusions, size, shape, and distribution in sheet steel, sample No. 1. The continuous oxy-sulphide stringers are in the secondary blow-hole zone.

• • •

AT RIGHT

FIGS. 7 (top), 8 (center), and 9 (bottom)—Photomicrographs showing typical inclusions, size, shape and distribution in sheet steel, sample No. 2. The continuous oxy-sulphide stringers are in the secondary blow-hole zone.



Copper for Electricity

NINTH of a series of articles dealing with "The Right Metal in the Right Place", designed to aid manufacturers in selecting the most suitable non-ferrous metal or alloy for their products

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OF all the non-ferrous metals, probably the best known, the most widely used, the largest tonnage metal, the metal with which the man in the street as well as the woman in the home are most familiar, is copper. The original metal of antiquity, it was probably first used for weapons and defensive armor. Today, second to no other, it is an indispensable material of civilization. It is the outstanding metal of the electrical industries.

But even though the electrical industries are far and away the largest users, copper has in its long history infiltrated throughout all metal products manufacturing to a degree perhaps unequalled by any other metal. As a result, the variety of its uses, the multitude of its forms and the number of its alloys has created a condition which may well leave the prospective user bewildered when he attempts to make a choice.

Basic Properties

Copper is a red metal of only moderate strength and hardness but very malleable and ductile. Cold working by rolling, forging, etc., increases its tensile strength and hardness. Where considerable strength and toughness are required, they must be obtained by the addition of other metals, with or without heat treatment.

The extensive use of copper for electrical purposes rests upon its high electrical conductivity. Only one metal stands above it in this respect—silver with a rating of about 105 as against

* Casting Manual for Non-Ferrous Metals, by Sam Tour, 1938.

100 for copper. All other commercial metals are lower.

Copper also ranks next to silver in heat conductivity.

Copper withstands many forms of corrosion. Historic evidence exists in copper implements of pre-historic origin, found by archaeologists. Atmospheric corrosion results in a skin of basic sulphate which does not absorb moisture and which resists further atmospheric attack. The protective corrosion product is commonly known as "patina," the familiar green coating. Such a coat can today be formed by artificial means for decorative and utility purposes.

Copper and its alloys have a relatively good resistance to a number of dilute acids, for example, acetic acid (in the absence of air), and a number of other organic acids, sulphur dioxide and sulphite solutions used in pulp mills, the alkalies, potassium and sodium hydroxide, and a variety of salts. It is resistant to domestic water, industrial and brine waters, and sea water.

Copper has always been the leader

in the trend toward high purity. Commercial copper, although produced in several grades suitable for a variety of purposes, is best known to industry in the form of electrolytic and "tough pitch" copper, over 99.9 per cent pure (silver being counted as copper) the balance being of oxygen and other minor impurities.

An even higher purity product is deoxidized or oxygen-free copper, a comparatively recent development. This grade is practically inert to the action of hydrogen and other reducing gases. It also seems to give superior service under repeated stress. It may be used to advantage for welded and brazed parts, and for parts subjected to difficult forming and spinning operations, because of its higher ductility.

Another important form is Lake copper, a fire refined metal, 99.9 per cent pure, which contains arsenic and silver. These are natural impurities in the metal as produced in Michigan and have no adverse effects except that arsenic reduces the electrical conductivity. Arsenical copper is used where the work requires greater



Pressure die casting copper-b

ity for Industry and for Decoration . . .



casting copper-base alloys.

toughness and wear resistance, for example, in locomotive fire boxes and stay bolt bars. Arsenic from 0.25 to 0.50 per cent raises the annealing temperature of the copper 90 deg. F. and 0.1 per cent silver raises it over 180 deg. F., thus retarding softening in high temperature service.

Casting copper, running about 99.5 per cent, made generally from secondary metal, is used for a variety of copper and copper-base alloy castings.

One of our oldest industrial fallacies is the "hardened" copper theory. Time and again such a "revolutionary" development has been presented—the production of hardened or "tempered" copper, a lost art "rediscovered." Although this ghost has been laid many times, no discussion of copper is complete without driving another nail into its coffin. There are only two ways of hardening copper. One is by cold work, which changes its properties as already noted; the other is by the addition (intentional or unintentional) of other metals, in which case it is no longer copper but either an alloy or an impure metal.

These additions, uncontrolled and in many cases unknown in proportions, and often accidental, may produce a material so brittle as to be useless for practical purposes. There are today, however, alloys of copper with small amounts of other metals which are not only hard but tough, whose properties are controllable and changeable at will within certain limits, by heat treatment. These copper base mixtures constitute an important modern development in copper alloys, but they are not hardened copper; they are *heat treatable copper alloys*.

Nomenclature

Together with the great number of copper base alloys has come a perfect swarm of trade names. It may almost be said that for every mixture containing copper, there is a special trade name. So, a very commonly heard question in industry is, "Have you heard of Blankilite? Where can I get it?" And all too seldom can one give the answer since Blankilite may be here today and gone tomorrow, and is at best only one of hundreds of specially named products. Another, and less innocuous complication is the fact that so many mixtures have been called "bronzes" or "silvers" regardless of their actual constituents. Of late, the Federal Trade Commission has taken steps to eliminate misleading trade names where precious metals are involved.

Alloys of Copper

Copper alloys may be grouped into classes based on their main alloying constituents. Copper-zinc alloys are brasses; copper-tin alloys are bronzes; copper-nickel alloys are cupro-nickels, and so on. However, on considering the copper alloys containing two or more other metals in varying amounts, many complications are encountered such as those which have made nomenclature such a problem. For example, copper-nickel-zinc mixtures are generally known as nickel-silver (originally German silver) but are really nickel-brasses. Along these lines, Tour* has made an important contribution in his suggestion that the term "brass" be confined to copper-

By ADOLPH BREGMAN

Consulting Engineer, New York

o o o

zinc alloys, and the term "bronze" be applicable to copper-base alloys containing alloying elements other than zinc, and in sufficient amounts to be predominant over zinc in their effect on the properties of the mixture.

The best standard list of copper base casting mixtures may be found in A.S.T.M. Specifications B-30-36, entitled Standard Specifications for Copper Base Alloys in Ingot Form for Sand Castings, which lists 20 mixtures of bronzes, red brasses, semi-red brasses, yellow brasses and high lead alloys, including an appendix giving their physical properties and examples of their uses. These few combinations may well be accepted to cover adequately, almost all the uses claimed for several hundred alloys under various and assorted trade names. Their constituents are principally copper with tin, lead and zinc, with very small amounts of antimony, iron, nickel and silicon. Their tensile strengths range from 22,000 to 40,000 lb. per sq. in.; their elongations, from 45 down to 7 per cent; their Brinell hardnesses, from 40 to 65. Their uses include valves, bearings, automobile fittings, plumbing fixtures, ornamental and architectural castings.

An outstanding special casting alloy is the "manganese bronze" (really a manganese brass), composed of 55-60 copper, 38 to 42 zinc, up to 1.5 tin, 3.5 manganese, 1.5 aluminum and 2 per cent iron. This is sometimes called "high-tensile" brass, for its very high strength, up to 70,000 lb. per sq. in.

In recent years, nickel has assumed considerable importance as a constituent, with up to as much as 5 per cent used for improving the casting properties of copper-base alloys and also as a factor in precipitation hardening in heat treatable alloys.

Castings for electrical work ("high conductivity" copper castings) most often contain chromium, beryllium, cadmium, nickel or cobalt.

The wrought brasses range in com-

position from 95 copper-5 zinc to 58 copper-42 zinc. Their color varies from red to yellow as the copper is decreased to 65 per cent. Below 65 and especially around 60 per cent the color again becomes more golden or red. They are obtainable as sheet, rod, wire, tube and forging stock, in various tempers, from soft (annealed) to spring temper. Tensile strengths run from 32,000 lb. per sq. in. to about 90,000 lb.; elongations from 70 down to 4 per cent. The high-copper alloys (rich low brasses) are the most malleable and ductile at ordinary temperatures. The low-copper alloys (high brasses) have high tensile strengths and can be worked hot as well as cold.

To some of these alloys, generally those ranging from 60 to 66 copper, lead is added in amounts varying from about $\frac{1}{2}$ to 3 per cent to facilitate machining. In some cases tin, from $\frac{1}{2}$ to 1 per cent is added to improve corrosion resistance. Typical uses, picked out of the enormous number of individual applications, are the following: Gilding metal—95 copper, 5 zinc—for inexpensive jewelry; commercial bronze—90 copper, 10 zinc—for hardware and window screening; rich low brass—85 copper, 15 zinc—for novelties and brass pipe; low brass—80 copper, 20 zinc, for architectural and building purposes; admiralty—70 copper, 29 zinc, 1 tin—for condenser tubes; cartridge brass—70 copper, 30 zinc—for cartridge cases and musical instruments; yellow brass—65 to 67 copper, 35 to 33 zinc—for drawn parts, springs, safety pins, fixtures, etc. (most commonly used brass, known as "2 & 1"); and Muntz metal—60 copper, 40 zinc—for fresh water condensers and architectural uses in modified forms.

The bronzes in commercial use when cast carry up to 20 per cent tin (for bells), but when wrought, generally from 10 per cent down. They are best known as phosphor bronzes by reason of the minute quantity of phosphorus used in the manufacture of the alloy. Their chief characteristics are high strength, hardness, resiliency and resistance to fatigue, all of which make them useful for springs. They are also widely used as bridge bearings for heavy duty service.

The copper-nickel alloys are another important class. On the high copper side, they make strong, tough alloys with good corrosion resistance. With more nickel they have valuable electrical properties like thermal electromotive force against copper or iron, and high electrical resistance. Copper with nickel from 2 to 5 per cent com-

petes with arsenical copper for use in locomotive fire box stays. The 95 copper—5 nickel is used for the driving bands of projectiles; 85 copper—15 nickel for bullet jackets; 75 copper—25 nickel for coinage. Cupro-nickel (copper 70, nickel 30) has made an outstanding record for itself in corrosion-resistant marine condenser tubing.

Copper-zinc alloys with up to 20 per cent nickel have long been standard materials, formerly known as German silver but now are called nickel silver, for use in silver plated tableware, flatware, keys, plumbing fixtures and architectural hardware. Changes in the nickel content give interesting variations in the colors of these alloys which makes them highly suitable for decorative architectural work.

The high nickel alloys are typified by Constantan, (60 copper, 40 nickel) which is used for resistance coils in potentiometers and as one of the wire elements in base metal thermocouples for measuring medium and low temperatures; and Manganin with copper up to 85, manganese up to 15 and nickel below 5 per cent, used in resistance coils or heating elements.

An outstanding example of a high nickel-copper alloy is Monel with about 67 nickel, 28 copper and 5 per cent iron, silicon and manganese. This natural alloy with a broad range of high strength and corrosion-resistance uses, which is really a nickel-base alloy, is discussed in the article in this series dealing with nickel.

A class of copper alloys which has steadily gained a firmer place for itself is the aluminum bronze group, with about 90 copper, 5 to 10 per cent aluminum, iron and other metals. Their outstanding qualities are high strength, toughness and general corrosion resistance. They find a place as rods, castings, condenser tubing and in numerous specialized applications.

At this time the trade is witnessing an important trend, the development of high strength and heat treatable copper alloys through the use of small quantities of additive agents, which produce improvements in the properties of copper far out of proportion to the quantities used. One of the most important groups in this class are the silicon-bronzes, containing up to 4 per cent silicon with small additions of manganese, zinc, iron and tin. The silicon-bronzes are as strong as mild steel and have a corrosion resistance about that of copper. For



E VERDUR electrical condenser for speed rail transit line across Delaware

that reason they have become an important factor in the manufacture of service parts in sewage disposal plants, chemical and industrial plants, for corrosion resistant tubing, pumps, tanks, wire mesh, screws, bolts, rivets and many types of fittings.

Another important newcomer is heat treatable beryllium copper, which contains about 2 to 2½ per cent beryllium, balance mainly copper. It has extraordinary strength, fatigue limit and hardness, and is therefore coming into extensive use for springs. Its cor-



condu...le runway adjoining the high
across Delaware River bridge, from Phila-
delphia, N. J.

rosion resistance is about the same as that of copper.

Copper-cadmium alloys, containing around 1 per cent cadmium, and copper-chromium (copper plus about 0.9 per cent chromium) have the advantage of high strength and abrasion resistance and at the same time much higher electrical conductivity than is generally found in alloys of copper, making them suitable for electrical conductive purposes where high strength and resistance to wear are required.

From this brief and necessarily sketchy review, it is clear that copper and its alloys are used in scores of industries and literally for thousands of specific applications. How then can the user of metals and the manufacturer of metal products know whether or not copper will "fit into his picture"?

In the simplest possible fashion the service for which this metal or its alloys must be considered are the following:

For electrical work of any kind, copper's preeminently high conductivity (the highest of any of the base metals) puts it in the first place. The electrical industries, which have in recent years consumed about 40 per cent of the copper produced in this country, include power transmission lines, current distribution apparatus, bus bars, switchboards, generators, motors, electric transportation equipment like locomotives, electric appliances like radio receiving sets, refrigerators, irons, toasters, washing machines, etc. In a word, if the product is electrical it is certain to use copper in one place or another.

In automobiles, copper or brass is the material for radiators. Heat conductivity and resistance to corrosion by water have kept them in use for this and similar purposes. Other automobile applications in metal and alloy form include carburetor parts and fittings, bushings, metal trim and accessories.

This same resistance to corrosion by water and air has enabled copper and brass to make outstanding records for themselves in household water piping, fittings, steam hose, hot water heaters and storage tanks, wire screening, hardware, lighting fixtures, etc. Other building and household uses include plumbing, screening, hardware, lighting fixtures, windows, air conditioning and refrigerating apparatus.

Its chemical properties have brought copper to the fore in equipment for the manufacture of a variety of chemicals: dilute acids, alkalies and salts; in distilleries and breweries; for gasoline supply; for textile printing, in food plants; in paper mills.

An important use "of an elder day" which was almost entirely lost, but which is beginning to come back, is in fine kitchen utensils. Copper kettles and pots, because of their appearance, their long life and their high heat conductivity rank with the best.

For industrial purposes, applications of copper and its alloys are so numerous as to be almost unlistable. Typical

examples include piping, pump liners, heavy duty bearings, gas, water and air fittings, locomotive parts and car journal bearings. In marine work copper alloys are indispensable by reason of their resistance to salt water corrosion. Manufacturing uses of importance include brazing solders and welding rods.

And in addition there are literally thousands of individual uses in novelties, moderate to low priced jewelry, clocks and watches, musical instruments, bedsteads, eyelets, pins, name plates, screws, rivets, picture wire—and so on almost indefinitely—all based primarily on the long life of the metal, its ability to be worked and to withstand abuse.

One of its important advantages is its attractive appearance and ease of finishing. Copper and its alloys have the unique faculty of being able to take readily almost any finish—from a plain polish to electroplate, lacquer, enamel, chemical colors and fancy art finishes. The very latest example is an electrolytic process for developing on copper most of the colors recognizable in the physical spectrum. Bronze statuary has come down through the ages. The appearance of copper, in metal or alloy form is always in its favor.

Future Trends

Copper is fully abreast of the times. It is at once the most ancient and the most modern metal. But it still has a broad future before it. Like many other metals, its development seems to be proceeding in the direction of alloys for special uses; and with the growing acquaintance of industry with the special, unusual and even the rare metals, this trend would carry on for some time. Among the metals now being used with copper are antimony, chromium, cobalt, molybdenum, tungsten, selenium, tellurium, zirconium, and even lithium, thorium and uranium.

The welding of copper and its alloys, originally a difficult operation because of its rapid oxidation, high heat conductivity and consequently rapid dispersion of the heat, is now being done regularly by the oxy-acetylene torch and the carbon and metallic arc.

Powder metallurgy which has aroused widespread interest has made more progress with copper than with any other metal and bids fair to continue developing. Oilless bearings using copper powder have been successfully used in large numbers in automobiles during the last few years.

(CONCLUDED ON PAGE 77)

ELECTRIC CLEANING

N***INTH** in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing*

ELECTROLYTIC cleaning is carried out in both acid and alkaline solutions. The latter solution usually precedes the acid bath for the purpose of removing grease, oil, dirt, or practically all types of foreign material. For the purpose of this article, the acid bath process is confined to the removal of rolling mill scale, heat-treating scale and scale produced on the work by various heating operations. Obviously, all such scale must be removed if a suitable finish is to be obtained; however, descaling on many machine parts is carried out for still a more important reason, specifically gears which run in oil in closed housings. The internal surfaces of such housings, and other structural elements must be freed of all scale for the sake of long life of the mechanism.

In general, such parts as transmission gears and gears of the differential unit, both found in the automobile, truck and tractor, require descaling to perform satisfactorily. Prior to the widespread adoption of descaling, it was not uncommon to find such parts shedding their scale through use, the result being that wear was increased to an unreasonable degree. On removing the scale prior to assembling, life of these machine elements has been appreciably increased. Although only a few of the parts usually given this treatment have been mentioned, there are many thousand other applications; in fact, electric descaling can be applied with a resultant increase in useful life and appearance to every metallic article somewhere along the production line.

Descaling has been considered as a regular operation in many manufactur-

ing plants for many years. It is more generally known under the name of pickling, which was designed to remove the oxides from the iron surface. The application of electricity to the bath is of more recent development and was designed to speed up the work of descaling and to limit the action of scale removal without effect upon the underlying metal. As such operations are speeded up, resulting in lowered labor and equipment stand-by charges, their application becomes more general. This is particularly true of the electrolytic method, which has served to reduce the time of pickling to a very appreciable extent. Since this method has become prominent in recent years, something should be known about the underlying theory.

The passage of direct current through an aqueous solution of acid or alkali liberates hydrogen gas at the cathode and oxygen at the anode. The hydrogen ion plates out at a point where the underlying metal is exposed, forming the nucleus of a bubble. As the bubble expands it pries off the dirt.

Obviously the liberation of hydrogen is the important function, and the condition of the bath as well as the use of current determines the speed of cleaning to a considerable extent. It has been found by experiment that with a consumption of 35 amp. of electricity per sq. ft. of cathode area and using a boiling electrolyte, approximately 20 cu. in. of hydrogen are evolved from each square foot of surface per minute. This seems to be the average practice in regard to the application today.

There are certain limitations with regard to the concentration of the electrolyte as well as the density of the current used. For instance, although the conductivity of the electrolyte in-

creases with an increase in concentration the point is soon reached where further increase in concentration is valueless and even detrimental. The manufacturer of the cleaner should be consulted as to the most efficient concentration to be used. One prominent manufacturer specifies that 6 oz. of their cleaner per gallon of water at boiling point and using direct current at 6 to 8 volts potential will give a current density of 35 to 40 amp. per sq. ft. of work surface.

Fig. 1 shows the application of the electrolytic process with an alkaline solution at the plant of the Mack Mfg. Co., located at New Brunswick, N. J. This is a portion of the Bullard Dunn Co. equipment in use and consists of a steel tank having a lead lining and a capacity of 438 gal. The cathode bars are spaced 12 in. apart. Direct current at from 3 to 6 volt potential is used. The solution is made up of 6 oz. of alkaline cleaner per gal. of water. The work is allowed to hang in the bath for a period of time from 4 to 5 min. The operator is seen removing transmission gears from the tank, rinsing them in cold water and placing them in the acid bath adjacent.

Of importance in the cleaning solution is freedom from too great a tendency to foam. With the usual vigorous gas evolution at the electrodes a solution having a tendency to foam or sud will build up a heavy foam blanket composed of hydrogen and oxygen bubbles forming an explosive gas mixture. This gas may be ignited by a spark from the electrode, the result being that liquid is thrown from the tank.

It is good practice to run the work through a washing machine prior to its being placed in the electrolytic cleaner, thereby using the latter for the finish work only. By washing the work in a solvent soap solution first and then rinsing, the saponifiable material is largely removed, which in turn avoids the production of a soluble soap in the alkaline solution.

Heat is almost a necessity in con-

*Technical director, Magnus Chemical Co.

Why and how to clean metals electrolytically—the solutions, current and equipment used and type of results to expect.

nection with electric cleaning and is advisable in all cases to increase the speed of the operation. The usual method of heating is by steam coils immersed in the solution and provided with an insulated bushing at the point where the pipe passes through the tank wall. It is not advisable to connect the condensate line from the heater coil to the regular vacuum return system in view of the possibility of leaks, in which case the solution would be taken over into the return system. Such a situation would be particularly bad when the bath is acid.

The electrical installation is quite simple, involving insulation between the electrode bars and the tank. Wide copper connectors are usually used between the electric source and the electrode bars. A two pole, double throw switch should be used so that the polarity of the current may be reversed when necessary. In large installations two tanks are used, each having a different polarity.

In Fig. 2 is shown the acid bath used at the Mack Mfg. Co. plant for descaling transmission and differential gears after heat treating. In Fig. 3 is shown the complete installation involving the use of 10 tanks in all. There are four cold water tanks placed so that the rinsing operation from each process tank is readily carried out without transporting the work any great distance. There is also one hot water tank for the final rinsing operation and to facilitate easy drying of the work. Of the process tanks, there is one degreaser shown in the close-up view, Fig. 1, the acid tank shown in detail in Fig. 2, and the stripper tanks. Also, there are duplicate acid and stripper tanks.

The work is left in the acid tank, consisting of 10 per cent sulphuric acid, for a period of from 3 to 4 min. From this tank the work goes into the cold

water rinse and then into the stripper tank. From the stripper tank the work again goes into the cold water rinse and then into the hot water rinse.

The acid bath is heated to 140 to 150 deg. F. and electrolyzed with direct current. A small quantity of tin is maintained in the bath, resulting in a thin film over the cleaned surface of the metal and also an increase in the speed of cleaning by causing the electric current to discharge upon the area remaining to be descaled (by reason of over-voltage effect on the tinned area).

The stripping tank contains 4 per cent trisodium phosphate and 12 oz. of caustic soda per gal. in the solution. The tank capacity is 255 gal. The work is hung on anode bars in this tank for a period of from 2 to 6 min. to accomplish the removal of the film from the work put on in the acid bath.

Following installation of the equipment, some trouble was experienced

due to rapid erosion of the drain pipes which were made of cast iron. This trouble was eliminated by the substitution of Duriron, which material is also recommended for the anode bars in place of ordinary steel or iron because of the avoidance of ferric iron in the bath which tends to decrease the efficiency of the process. From 1 to 2 per cent of the total anode surface is made of block tin to allow a constant feeding of tin to the bath to compensate for that which is plated out in the descaling process. In Fig. 4 are shown samples of the work which have been through the equipment just described. The deep recesses of the gear are thoroughly cleaned of all scale and the tooth form is accurately maintained. In Fig. 5 are other types of work which have been cleaned by the Bullard Dunn process, showing the work before and after cleaning.

The electric cleaner is especially well adapted to cleaning metals which tarnish easily inasmuch as lower con-

FIG. 1—Electrolytic cleaning of transmission gears in an alkaline bath. . . .

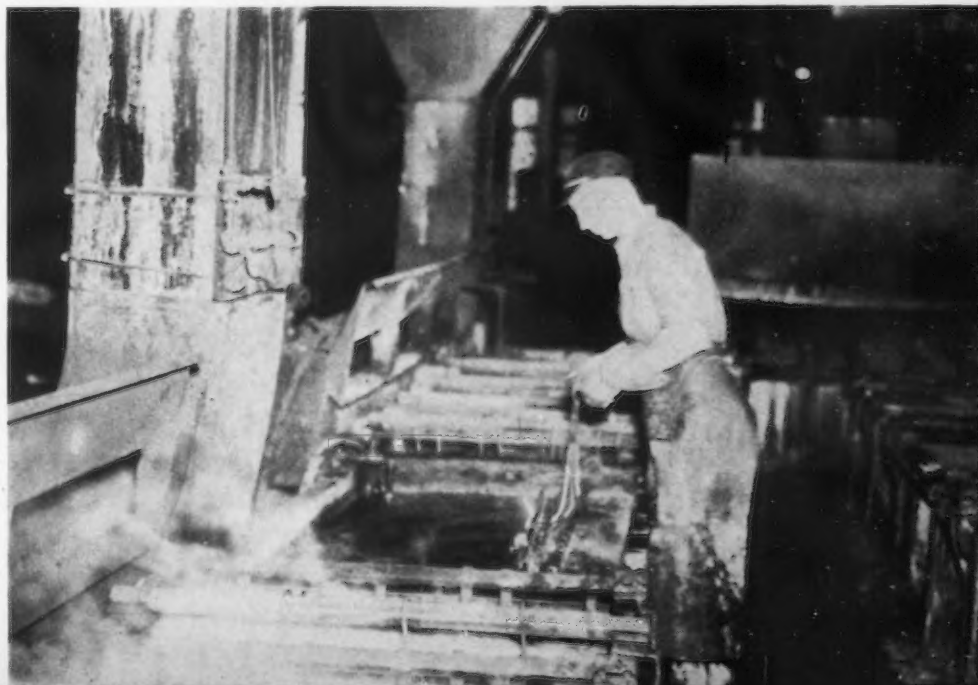




FIG. 2 — Acid bath used to descale transmission and differential gears after heat treatment.

centrations and lower temperatures may be used while more vigorous action is obtained by the application of the electric current. In the case of cleaning of copper and brass, the tarnish produced by a short anodic cleaning period is slight and may be readily removed by a dip in a 5 per cent solution of sulphuric acid.

Steel and iron may be cleaned by making the work either anode or cathode. In some installations advantage

is taken of both anodic and cathodic cleaning by reversing the polarity during the process. Where this is done two reversals are usually necessary; first, the work is made cathode for from 1 to 2 min., then the switch is thrown changing the work to the anode for a half minute. The object of this change is to take advantage of the "plating-off" action for black smut when anode. The black smut found on the surface of the work is a mix-

ture of finely divided black iron oxide, iron carbide and carbon (which was alloyed with the steel). This "plating-off" may be done in either alkaline or acid solution. In the latter solution, as used in the above example, the method is more effective. The operator retains hold of the switch handle during the half minute the work is anode and then turns the switch back to make the work cathode for a few seconds. The object of this last rever-

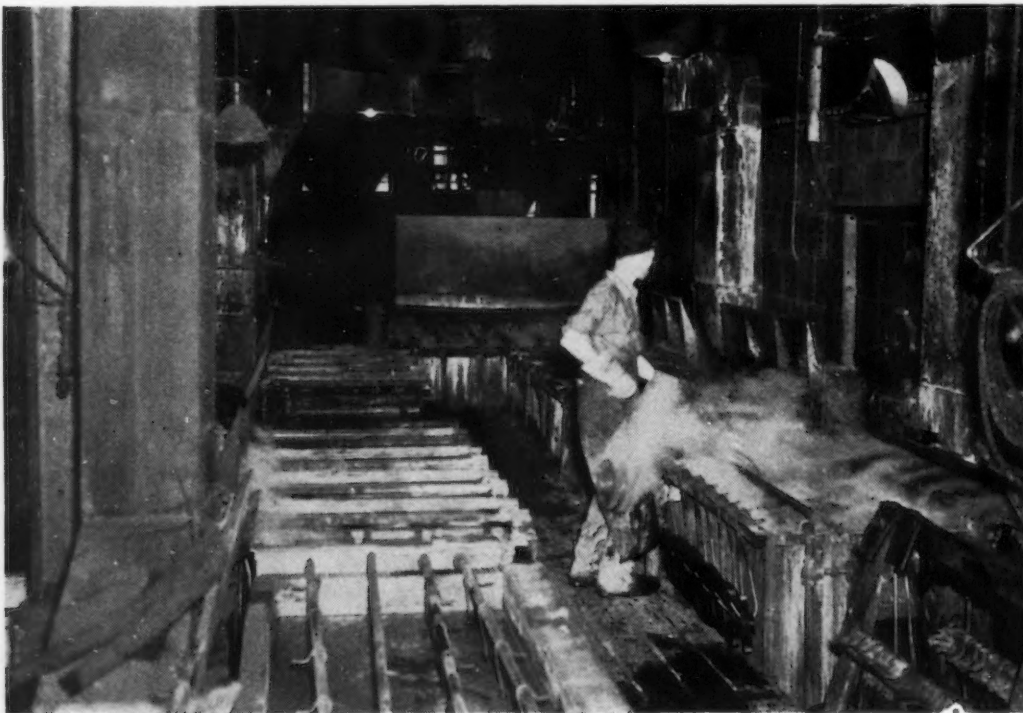


FIG. 3 — Complete installation, 10 tanks in all, used for electrolytic cleaning of metals in the Mack Mfg. Co. plant.

sal is to free the oxygen on the surface of the work. The work is then rinsed.

At the Mack Mfg. Co. steel tanks having lead linings are used. So far, the system has been in use for five years and the tanks are in excellent condition. These tanks cost approximately \$300 each. Wood tanks have been used, and also steel tanks with rubber lining. The wood tanks can be produced for about one-third the cost of the lead-lined tank and the rubber-lined tank will cost approximately 50 per cent more than the lead-lined tank.

At the plant of Hermann Maach, located in Pottstown, Pa., both wood and steel tanks are used. The steel tanks are lead lined and are, in most instances, of the usual size or 4x4x5 ft. At this plant a large part of the work handled is die cast, which requires a slightly etched surface. A

Considerable wiping of the work is done at this plant. This work is carried out by hand, using underwear cloth obtained from a local textile manufacturing plant. This cloth gives off less lint than other kind of cloth.

After wiping, the work is racked on

must be carefully observed. If this upper surface is removed, the porosity of the surface is increased. At best, die cast work is difficult to clean thoroughly due to the nature of the surface; however, it is necessary that a thorough cleaning job be done, espe-

RIGHT

FIG. 4—The deep recesses of these gears are thoroughly cleaned of all scale and the tooth form is accurately maintained.

• • •

BELOW

FIG. 5—Splined shaft before and after electrolytic cleaning. Photo courtesy the Bullard Co.



cially where plating is a subsequent operation. Polished parts must be cleaned quickly and, since the metal consists of principally zinc alloyed with other soft metals, it is sensitive to alkalis. The cleaning solution should not be over 180 deg. F. to avoid excessive attack.

Where either sodium silicate or trisodium phosphate is used for die cast work, the addition of about 10 per cent of free caustic soda will produce the desired etched surface. The silicate will act as a buffing agent; the phosphate acting as an emulsifying agent and aid in the rinsing. Where electric current is used, no soap should be added, but in the absence of the electric current a 2 per cent addition of anhydrous soap will facilitate the cleaning.

There are several outstanding methods on the market for cleaning, using the electric current in the bath, and these will be treated in other articles of this series, which will appear in later issues.

3 per cent muriatic acid solution is used. The work is prepared by passing it through a Blakeslee degreaser, using tri-chlor-ethylene solvent. Three gallons of this liquid are added to the tank each week. The work is placed in baskets holding from 20 to 40 lb. per load, depending on the class of casting being handled. Forty baskets are passed through the degreaser per hour, and thus the weight per hour averages about 1200 lb.

special racks and hung in the alkaline tank, the solution being 5 oz. of alkaline cleaner to a gallon of water. The solution is heated to 180 deg. F. The electric potential is 6 volts and the time element is 30 sec. as cathode. The work is then rinsed in cold water after which it goes into the acid bath described above.

Die cast work usually has a thin skin of finer texture metal on the surface; therefore the cleaning operation

BLAST CONDITIONING DEEMED SUCCESSFUL



INCREASE of output, lower consumption of fuel and greater uniformity of product are cited by L. Logan Lewis, vice-president of Carrier Corp., Syracuse, N. Y., as the principal advantages of blast furnace air conditioning. In addition, it is stated that the blast furnace superintendent need no longer be a weather prophet.

Speaking before the industrial air conditioning session of the Eastern Air Conditioning Conference at Lehigh University, Mr. Lewis told the story and results to date of the air conditioning equipment recently installed at the Woodward Iron Co. plant, Birmingham.¹

On a maximum day the Woodward dry blast plant prevents more than 30 tons of water from entering the furnace, according to Mr. Lewis. Lowering moisture in the blast reduces the amount of coke which must be burned for each ton of iron produced and increases the total output which can be obtained from a furnace.

In reviewing the history of "dry blast," Mr. Lewis pointed out that attempts to apply this principle to blast furnace usage were made as early as 1880 with calcium chloride, sulphuric acid and other chemicals. However, it was not until 1890 when James Gayley began his experiments with refrigeration that the present successful method began to take shape.

Accounts of an early installation, Mr. Lewis explained, reported material saving in coal and contained the following significant statement:

"It had been admitted by nearly all metallurgists that there were great advantages in having dry blast. Not

only did one get decreased fuel consumption, but one got what was almost of greater importance—greater uniformity of product."

Dewpoint of 40 Deg. F. Selected

A modern installation was recently made at the Woodward Iron Co. works.² The blast furnace is a medium sized one, having an output of 400 to 550 tons per day of merchant pig iron on a metallic yield of approximately 36 per cent, according to Mr. Lewis. The wind required is 45,000 to 50,000 cu. ft. per min. A moderate dewpoint of 40 deg. F. (slightly less than 0.007 oz. per cu. ft.) was selected as the most practical. Refrigeration is supplied by 53-9-9 turbine driven Carrier centrifugal machine, doing 520 tons of work in cooling 2.7 lb. per min. of water.

Water removal is accomplished by cooling and condensing with direct sprays on the suction side of the blowing engines. Outside air is drawn in through the intake stack and carried from the dewpoint chamber to the blowing engines. The dehumidifier is two-stage with partial elimination between stages. The water is pumped from the sump of the second air stage to the sprays of the first air stage and then from the sump of the first air stage back through the refrigerating machine. The casing is constructed of concrete and the eliminators are of special rugged construction.

The dry blast plant was put in operation in the latter part of June. The response of the furnace to drier wind was immediate and impressive, said Mr. Lewis. Burden was promptly increased. A noteworthy reduction in coke per ton of iron followed promptly and the silicon content of the iron also responded to the lowered moisture content.

Time will be required for the accumulation of conclusive quantitative data and experiences, but Mr. Lewis made the comment that Gayley's idea was, at the very least, "born 30 years too soon," and that it had to wait for more practical dry blast equipment, for the demand for tighter product specifications, and for noteworthy improvements in furnace practice to uncover weather as a variable of important and significant magnitude.

Of quantities involved, Mr. Lewis said, the normal wind required in the Woodward furnace amounts to 2700 net tons of air per day or 5.6 tons of air per ton of iron. Each grain (0.0023 oz.) per cu. ft. per min. means a little more than five net tons of water per day.

Without dry blast, variations in moisture content weather are fought (by some) by varying the temperature of the hot blast, Mr. Lewis explained. General practice in this respect is to allow 25 to 50 deg. for each grain per cu. ft. of free air. This is an appreciable item in the heat balance. It requires that reserve capacity be left in the stoves in anticipation of sudden rises, and that with rapidly falling dewpoints, the temperature of the blast must be depressed below this practical maximum.

Since the charge is introduced some 10 to 12 hr. before it reaches the hearth, weather must either be accurately predicted hours in advance or ample leeway left in hot blast temperature for the purpose of keeping the furnace regular until the burden can be changed to conform to whatever weather is expected at the end of the 12 to 18 hr.

Lowering moisture in the blast reduces the amount of coke which must be burned for each ton of iron produced, and increases the total output which can be obtained from a furnace. One grain of moisture (0.0023 oz.) per cu. ft. accounts for about 48 lb. of coke per ton of iron—a little more than 6 grains, therefore, about 300 lb. of coke per ton of iron.

These tangible savings, plus that of increased production, are of at least sufficient magnitude to cover more than the operating and maintenance costs of the dry blast plant, according to Mr. Lewis. Of vital interest to all, therefore, is the value of the velvet in the form of such intangibles as regularity and the power to produce at will the quality or kind of iron desired free from krish and scruff and to hold these qualities within narrow limits.

¹See additional description, *THE IRON AGE*, July 20, 1939, p. 38.—Ed.

²Refrigeration equipment for a second furnace has just been ordered.—Ed.

Modern

PERMANENT MOLD CASTING

By EDWARD C. HOENICKE,

*Sales Manager, Eaton Erb Foundry
Division, Eaton Mfg. Co.*

SEVENTEEN years ago the Holley Carburetor Co. first introduced the permanent mold process of producing gray iron castings on a commercial scale. In the intervening years the mechanical equipment and casting technique associated with this method have been refined to the point where outside of acknowledging certain fundamental principles, there is little in common between the single-head hand-operated machine of 1922 and the multi-head, automatic equipment of today. In this article the author, who has long been associated with permanent mold casting, describes the modern method of producing permanent mold castings, as practiced by the Eaton Erb Foundry which in 1932 acquired the rights and patents of the Holley company. In the past year the Eaton Erb plant shipped over 28,200,000 permanent mold castings to consumers located in 18 states and Canada.

The construction of the mold, the application of the refractory coating and the thermal treatment given the castings are touched upon in the article, and to indicate the facility with which complex cored castings, as well as simple solid shapes, can be produced by this method, a number of examples of the types of castings turned out by the Eaton Erb foundry are shown on pages 48 and 49.

THE original development of the permanent mold process was carried on with manually operated, lever-type, single head machines. Subsequent improvements resulted in the perfecting of a cam operated turntable, and finally the 12-head, semi-automatic, air operated machine with rotating molds and suction cooling, such as is used today.

This 12-headed machine consists of a large base on which revolves a dodecagon hub. Twelve hollow arms, extending radially, are bolted to this hub. Joining the arms at the extreme

ends are the outer heads, to which are attached half a mold. These outer heads are cast with a hollow section which permits approximately 500 cu. ft. of air per min. to be drawn across the back of the mold. This air is sucked through the head, into the radial arms and is then exhausted through the hub. The 12 inner, or moving, heads are mounted on rollers, movement being obtained through 8-in. air cylinders controlled by three-way valves which alternately close, hold and open the molds.

Each inner head has a telescopic de-

vice which allows a continuous flow of air across the back of the inner-half mold equal to the volume flowing across the back of the outer half-mold. The molds are attached to the heads by means of two bolts for each half mold. Both inner and outer halves can be changed in 15 min. by one man.

An acetylene flame, which deposits a coating of carbon on the molds as they pass by, is controlled by a cam attached to each outer head. These cams also start and stop the blowing arrangement which cleans the molds of excess soot and dirt. Rotation of the machine is provided by a ring gear, attached to the dodecagon hub, and a pinion gear driven by an electric motor through a gear reducer. The insertion of the gear reducer in the driving line makes it possible to obtain speeds from one revolution in 2 min., to one revolution in 6 min.

Each casting machine requires two attendants, one to pour and one to eject the castings, all operations being performed while the machine is in motion. An additional operator is required to set cores when cored forms are cast.

Molds Standardized

All molds used with the 12-head machine are standard and interchangeable; four sizes cover the entire range of castings produced. The molds are



Typical Permanent Mold Castings

VERSATILITY of the castings shown on these two pages, together with some notes on service requirements, follows: 1—High pressure plug valve for oil field use; must withstand occasional pressure of 2000 lb. per sq. in. 2—Typewriter segments; must not warp after machining. 3—Hydraulic brake cylinder; ease of machining and leak proof walls are essential. 4—Paving blocks; must stand severe shocks. 5—Flat iron base; must take a chromium plated finish. 6—Washing machine gear; uniformity of structure is necessary for close tolerances in teeth dimensions. 7—This plug, which goes with valve body shown in (1) is extensively machined to selective fit. 8—Cylinder head castings; service valve on side of head is cast integral. 9—Connecting rod; must have good bearing surfaces.

10—Pistons; must not warp or distort after machining. 11—Automobile oil pump body; 500,000 of these are in service. 12—Lack of segregation in counterweight section is said to make permanent mold castings ideal for crankshaft service. 13—High machineability was important reason for choosing permanent mold iron for these gears. 14—Carburetor body; must be absolutely free of leakage. 15—Cylinder block; freedom from porosity and ability to take fine finish on cylinder wall essential. 16—Tractor bearing retainer; inside diameter is completely machined in one broaching operation. 17—Complex refrigerator pump head; must be free from porosity. Varying section thickness complicates production molding in sand. 18—Refrigerator valve bodies; must have dense structure for valve seat, withstand high pressures and be free from leakage.



all hollow backed with a box-like side wall. Cooling pins approximately $\frac{3}{8}$ in. in diameter cover the entire back area of each mold to assist in maintaining the mold temperature at the proper level. Bosses to attach the mold to the head, and side bosses for the dowel pins, are cast integral. Runners are located at the bottom of the down sprue, in a horizontal position, and run across practically the entire face of the mold. The cavities are placed above the runner and are connected by the gates.

In multiple molds, one cavity is placed above the other and the riser of the bottom cavity serves as the gate for the upper cavity. The top of the mold, which is at a 5 deg. angle to the face, is divided into three parts—the center acting as a pouring basin and the two outer sections serving as pools for overflow metal from the risers.

The procedure followed in making a new mold is, briefly, as follows: Casting in dry sand; sandblasting; $\frac{1}{8}$ in. machine cut on top and bottom face; inserting dowel pins; laying out the cavity; machining the cavity; in-

stalling vent plugs, and, finally, coating with refractory material. The refractory coating is applied with the mold at about 400 deg. F., and is followed by a carbon smoke (this double coating is covered by basic patents). Then follows a tryout with lead to check dimensional accuracy. Subsequent test pours are made with iron to check gates, risers and vents and the necessary adjustments are made at this point.

Molds Preheated to 500 deg. F.

Before placing the machine in operation, the molds are preheated to about 500 deg. F. The operating cycle varies from 2 to 6 min., depending upon the size of the casting. After molding, the castings are completely annealed to remove strains inherent to the quick setting of the metal and to remove any possible small corners of white iron which may be present due to the mold not being properly heated, coated or smoked. In annealing, the castings are brought up to 1575 deg. F. in $1\frac{1}{2}$ hr., held there for 20 min., and then cooled slowly for $1\frac{1}{2}$ hr. The scale incidental to open furnace operation is

removed by shot blast and the castings are then ready for machining operations.

The design of the machine and the standardization of mold sizes give considerable flexibility as to the types of castings that can be produced on one machine. Either 12 identical molds or 12 different types can be worked at the same time. The only qualification is that the mass of metal in each mold be in balance with that in the other molds, to permit a constant pouring and cooling cycle.

Castings produced by the permanent mold process are particularly uniform throughout the entire range of section and are free of porosity. The absence of porosity and segregation may be credited primarily to the rapid cooling characteristics of the process. By proper design of the molds it is possible to obtain directional controlled solidification.

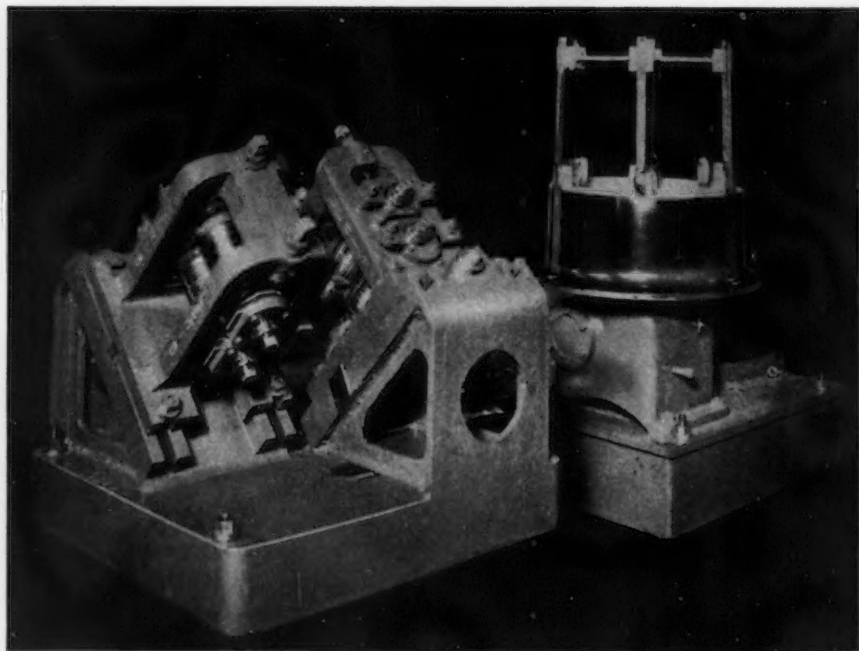
Users of castings produced in permanent molds have reported that faster speeds and feeds may be employed in machining the castings, which logically makes for lower machining costs.

Roll Planishing Mill Cuts Wire Coating Loss

A NEW type planishing mill designed to give luster to dull coated wire without damage to the coating has been developed by the Lewis Foundry & Machine Division of Blaw-Knox Co. The machine has the appearance of a pilot mill, but is intended for actual production.

Efforts to brighten wire by drawing through dies has usually resulted in some loss of coating. This loss is claimed to be avoided in this new unit by the rolling action of a two-pass mill. The unit is equipped with two roll stands which are set at 90 deg. to each other to insure planishing of the full surface of the wire. In operation the wire is fed from rough coils set on a reel, through the rolls, and then rewound into finished coils. Motive power is applied through the winder. The unit is designed to keep pace with one wire production line and is furnished with a coil winder.

Company engineers report that the design can be adapted to provide a sizing mill at the end of a rod mill roll train.



NEW type roll planishing mill designed by Lewis Foundry & Machine Division of Blaw-Knox Co. which is said to brighten dull coated wire without damaging the coating on the wire. The complete unit weighs 1600 lb. and will keep pace with a one-wire production line. The winder supplies the motive power.

GRANITE CITY EXPANDS CAPACITY

THE largest producer of flat rolled steel products west of Chicago, the Granite City Steel Co., Granite City, Ill., recently installed additional finishing equipment—a United 48-in. 4-high reversing cold strip mill, a United temper pass mill, and other auxiliary equipment.

This producer, with an annual capacity of 275,000 gross tons of finished hot rolled products, by virtue of these new mills, is now able to supply customers with all types of surfaces and tempers, and has attained a considerably greater degree of flexibility in arranging rolling schedules.

The new cold mill is similar to another United mill installed two years ago. Each of the mills has an average monthly capacity of 3500 tons black plate and 4000 tons of strip. Averaging five to six passes to a 10,000 lb. coil, the units operate at a maximum of 1200 ft. per min., rolling up to 44 in. wide and 0.006 to 0.061 in. thick.

Before the new cold strip mill was acquired, Granite City had to depend upon the earlier installation for all of

its cold rolled material, for tinning and otherwise. Since the tin plate capacity is 1,700,000 base boxes annually, and the entire output of the one cold mill was only 1,000,000 base boxes of tin plate, there resulted a serious bottleneck which was particularly severe in times of near-capacity operation.

Thus the advantage afforded by the new cold mill is obvious, when previous conditions are considered. Today one mill can be devoted entirely to the demands of the tin house, if need be, while the other is left free to accommodate users of cold rolled strip.

Both the cold strip mill and the temper pass mill are powered by Al-lis-Chalmers equipment. Thirty bearings of the temper mill are lubricated by a Lincoln Flex-O-Matic lubricating system.

For shearing cold strip as it comes from the delivery reels of the cold mills, Granite City has two shear lines, one a Hallden shear, being new. This latter handles up to 16 gage maximum thickness and 144 in. maximum length, and operates at 300 ft.

per min. Other new equipment includes two Wean collapsible coiler reels, a Wean tension device and two Lee Wilson annealing covers. The annealing department, which now consists of two covers and seven bottoms, soon will be enlarged to include three covers and ten bottoms.

Before installing the new equipment it was necessary to construct a 112 ft. addition to the cold mill building, which now measures 280 x 75 ft. A new structure was erected for the temper mill, 236 x 75 ft., a 236 x 40 ft. lean-to connecting with the cold mill building. A new coil storage building 152 x 50 ft. also was constructed. In addition, a cold mill office building, which includes shower, locker and toilet facilities for 200 men, has just been completed.

Harnischfeger cranes, a 15-ton unit for the cold mill, and a 50-ton crane plus a 10-ton auxiliary for the temper mill building, are now in operation. On the trolleys and bridges of these two cranes are a total of 88 lubrication points, which are serviced by Flex-O-Matic systems.

THE new cold mill, shown here with a coil part way through one pass. A single coil usually averages five to six passes in this mill.



WHAT'S NEW IN PLANT SERVICE

OF particular interest to the plant engineer and the maintenance supervisor are the many items of equipment relating to plant service put on the market in recent months. Design improvements continue apace in unit heaters and the problem of ventilation is an ever present one for which blower makers offer new an-

swers. Air compressors, pumps, valves, pipe fittings, pipe benders, lubrication devices, liquid conditioners for mill water waste, door openers, signal devices, cleaning equipment, dust collectors—all of latest types—are mentioned in this review, which also illustrates some of the newest devices for worker protection.

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FIVE means have been taken to deaden sound in a new line of unit heaters announced by the *Modine Mfg. Co.*, Racine, Wis. The entire casing is lined with an acoustical mastic; a velocity generator (stationary fan) evens air flow through the condenser and eliminates air-rush noise peaks; a venturi shaped fan shroud also reduces air inrush noises; concentric rings of the safety fan, built into the unit, dissipate vibration; and lastly the fan driving motor is resiliently mounted in rubber on the fan guard. Furthermore, rust protection is given all sheet metal parts by the Bonderizing process. The new units are also said to provide for increased velocities of outlet air and

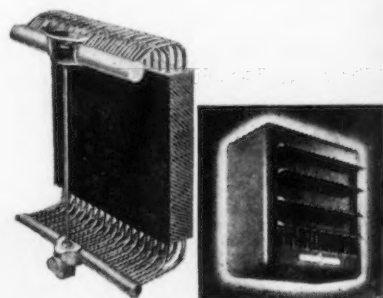
greater room-air turnover without, however, causing undesirable drafts.

ASERIES of five gas-fired unit heaters, ranging in capacity from 85,000 to 200,000 B.t.u. per hr., and equipped with automatic flues for venting products of combustion from interior of buildings has been announced by the *Automatic Gas-Steam Radiator Co.*, 455 Brushton Avenue, Pittsburgh. The automatic flue consists of a small motor and blower connected in such a way that when the heater starts to work, the flue motor automatically starts up. The assembly includes a safety pilot that turns off the gas if the pilot goes out or burns too low to assure ignition. The gas

fires into a combustion chamber and the products of combustion pass up a bank of tubes, around which air is blown by a motor driven fan. These heaters employ natural or manufactured gas for fuel and are applicable to many types of buildings, including manufacturing plants. They may also be used for other purposes, such as ventilating, cooling and drying.

The same company has also announced a new automatic control and safety pilot for its regular line of gas-steam radiators for use in small shops and other places where it is not feasible to operate big boilers.

RECOGNIZING certain factors of operation that tend to limit the life of unit heaters, the *Herman Nel-*

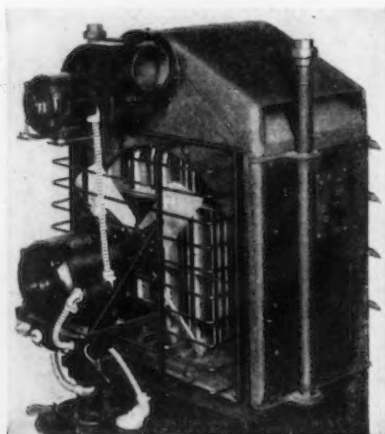
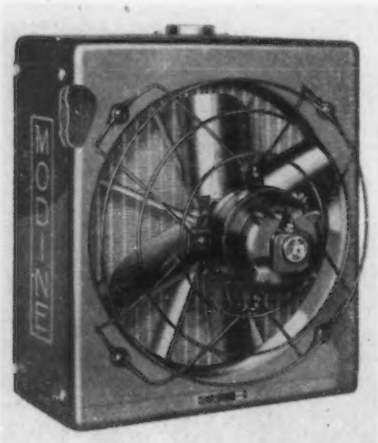


THE use of an extra heavy stay tube between the supply and return headers of Herman-Nelson hiJet unit heaters allows entrained moisture in the steam line to drain directly into the return header without entering the regular heater tubes. It also maintains proper relationship between headers without increasing strain on loops.

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BELOW

FIVE noise abatement design features have been incorporated in the new line of Modine unit heaters, now made with cleaner, flowing lines, rounded corners, and V-form louvers deeply recessed.



AN auxiliary motor driven blower automatically vents the products of combustion in this new line of ceiling suspended gas-fired unit heaters made by the *Automatic Gas-Steam Radiator Co.*

o o o

son Corp., Moline, Ill., has introduced a new stay tube feature for its propeller fan type unit heaters. This feature has been built into the heating element between the supply and return headers to allow any entrained moisture to drain directly from the supply header to the return header without entering the other tubes of the heating element. If this entrained moisture is corrosive it will first affect the stay tube which has been made four times as heavy as the other tubes in the

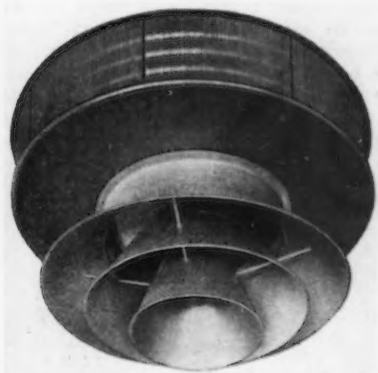
EQUIPMENT

By FRANK J. OLIVER

Associate Editor, *The Iron Age*

heating element for longer life. Another function of the stay tube is to maintain the proper relationship between the supply and return headers and thus leave the loops free to take care of only the expansion and contraction between individual tubes.

THE addition of a new model of 75 EDR (sq. ft. equivalent direct radiation) capacity to the Fedders series 4 unit heaters is announced by the *Heating Division, Fedders Mfg. Co.*, Buffalo. The complete line now comprises 25 models in steps of 50 to 100 sq. ft. EDR between various sizes, thus making available the most effective



PROJECTION unit heaters made by the Trane Co., La Crosse, Wis., are now available with the Anemostat high velocity air diffusers attached as shown. Three or four cone units are offered, depending upon the ceiling height, better distribution for low heights being obtained with the four cones. The Anemostat, made by the Anemostat Corp. of America, New York, consists of hollow flaring members, two of which act as injectors only while the other members have the dual function of ejectors and injectors, thus creating a multiplicity of air currents traveling in planes at a variety of angles to each other. Velocity energy is transformed into pressure energy and practically draftless distribution of warm air is effected.

and economical sizes to fit the exact load conditions encountered in plant heating. Complete specifications are given in bulletin 573.

Fans and Blower Units

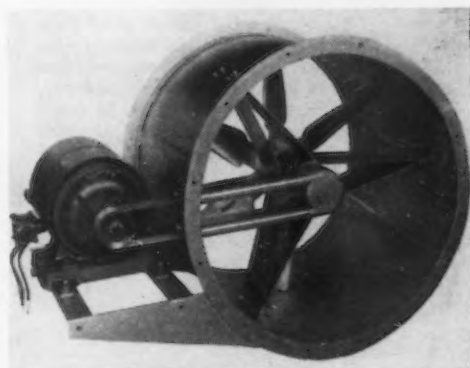
TWO types of propeller fans have recently been introduced for application where the motor must be outside the air stream, such as in handling paint fumes. Both models use V-belt drive although of quite different form. In the Buffalo "L" Breezo fan housing, the motor is mounted on the side of the housing and drives the fan shaft from above. The pulley and adjacent fan shaft bearing are completely outside the air stream, while the bearing at the fan end is in the



MOTOR, V-belt, pulleys and one fan bearing are entirely outside the path of air being handled in the new Buffalo "L" Breezo fans for use with ducts.

air chamber itself. This bearing is regularly of bronze, inclosed and wool packed, but a ball bearing can be furnished. These fan units come in sizes from 12 to 36 in. and from 1/6 to 3/4 hp. respectively.

IN the South Bend fan unit designed for duct line use, furnished in both single fan and tandem fan types, the explosion proof motor is also located outside the housing, but the fan pulley and part of the belt length are within the air stream, covered, however, with a suitable metal shroud. Blades are drop forged aluminum alloy. When used to handle acid fumes, all exposed parts can be furnished covered with Heresite. Single fan units are



THIS South Bend explosion proof fan unit is easily installed in any duct line without fitting other than for a simple flange on end of duct. It is designed for static pressures up to 3 in. of water.

available in capacities from 1600 to 26,000 cu. ft. per min., and tandem units up to 30,000 c.f.m. They are manufactured by *South Bend Air Products, Inc.*, South Bend, Ind.

Centrifugal Pumps

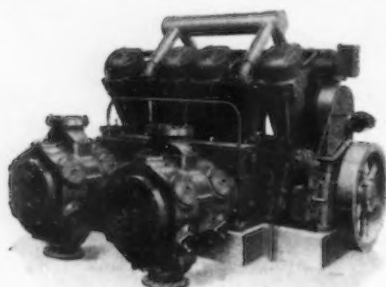
BALL bearings are now standard equipment on nearly all lines of single-stage centrifugal pumps made by *Allis-Chalmers Mfg. Co.*, Milwaukee. The design is a single-row deep-groove ball bearing on both ends of the pump in cast iron adaptors arranged for grease lubrication. The designs call for conservative loadings based on carefully computed thrust and radial loads. The single row type of anti-friction bearings have long been successfully used in the company's motors. However, where specific engineers call for double-row ball bearings the Allis-Chalmers design permits that type to be used at but slight extra cost. The housings are also designed so that sleeve bearings may be accommodated should the user prefer this type.

Valves and Fittings

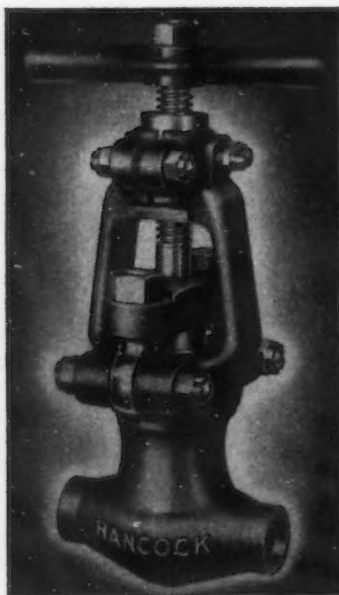
TO eliminate leakage through the conventional gasket joint between valve body and bonnet at elevated temperatures and pressures, the *Han-*



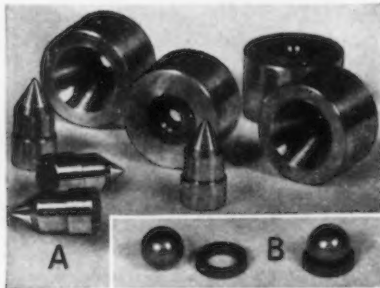
STAMPED blades made of hardened steel are featured in this low-cost fan assembly made by William J. Lohman, Inc., 62 Ninth Avenue, New York. The six blade assembly is made in sizes from 30 to 72 in., with strength and weight necessary for heavy duty service. Excellent balance and high delivery efficiency are claimed for these fans which may be used either for direct or belt drive.



INGERSOLL-RAND announces a new heavy duty, gas-powered compressor, known as the LVG, using six or eight V-type power cylinders of 485 and 650 hp. total output respectively. The engines incorporate overhead valves and removable wet type liners in the power cylinders. Lubrication is full force feed, with oil cooled crowns on the power pistons. By using only two compressor frames on either size, the inlet, discharge and inter-stage piping and manifolding are simplified. Cylinders are supplied for pressures up to 5000 lb. and for vacuum service.



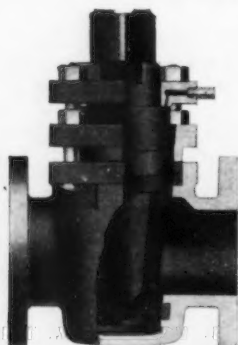
PARTICULARLY designed for use in handling explosive liquids where leakage through a bonnet gasket might be dangerous is the new Hancock No-Bonnet-Joint valve, made for pressures up to 2500 lb. at 1000 deg. F.



PUMP valves and other valves subject to unusual abrasive or corrosive action are now being successfully made of Kennametal, the new intermetallic compound of tungsten-titanium carbide, manufactured by McKenna Metals Co., 144 Lloyd Ave., Latrobe, Pa. Recent tests indicate that high pressure needle valves made of Kennametal will far outlast valves of other materials. Kennametal balls and seats were found also to outlast tungsten carbide valve parts when hammered one against the other in a test.

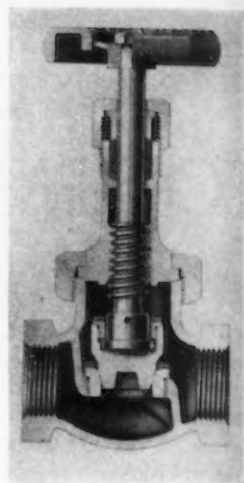


A NEW range of small sizes from $\frac{3}{4}$ to 5 hp. has been added to the line of Ingersoll-Rand type 30 compressors, built in sizes up to 15 hp. and up to pressures of 1000 lb. They are available with or without drive, receiver mounted or bare. Type 30 compressors embody a simplified type of stainless steel finger valve construction and have separately mounted, semi-steel cylinders, honed and lapped. Pulleys are grooved for V-belt drive. At 100 lb. per sq. in. pressure, the piston displacement ranges from 4.7 to 26 cu. ft. per min.



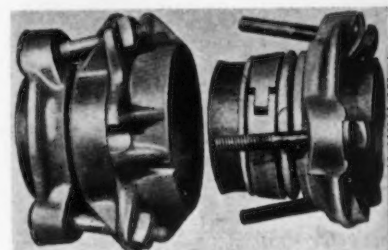
A NEW line of dual gland, asbestos groove-packed iron cocks has been announced by the Reading-Pratt & Cady Division of the American Chain & Cable Co., Inc., Bridgeport. This new type has the usual gland to hold the plug in position and an additional gland, separately controlled, to compress the top packing. This design results in a 50 per cent reduction in the effort required to operate the cock and there is less wear on the moving parts. Alemite lubrication is provided through a groove between the top of plug and gland.

PLUG type seal and renewable seat ring of copper nickel alloy are featured in the new line of Kennedy bronze globe and angle valves, designed for close control in throttling.



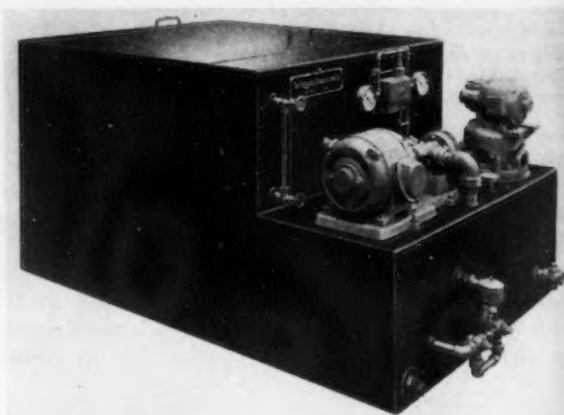
BELOW

THE new style 102 shoulder type plain end pipe fitting, announced by the Gibbons Mfg. Co., Worcester, Mass., takes advantage of the flare produced in roll cut pipe to produce tension resistance in the completed joint. View at left shows partial assembly of central body and left draw-in collar. At right is draw-in collar, outer copper lock ring, rubber coated, collapsible lead bushing with mortise joint, and small copper lock ring. The inner lock rings prevent the lead or its rubber coating from being extruded into the pipe, and the outer ring forms a permanent seal at that point of contact with the body. These fittings are carried in stock for $1\frac{1}{2}$ to 12 in. pipe sizes and may be made to order up to 40 in. The fitting is also made without a shoulder on the body of the fitting.



BELOW

IN the new DeLaval Unilube force feed lubrication system, there is incorporated in a single compact system automatic pressure filtration and automatic temperature and pressure control of the lubricant supply.





USE of an unbreakable plastic reservoir makes this Trico gravity feed oiler 50 per cent lighter in weight than oilers with glass reservoirs. The bottle is cemented and roll clinched to the heavy brass base. The ratchet feed mechanism is concealed underneath the "streamlined" dome. Needle valve is housed in a heavy brass tube. This oiler is furnished in 1, 2, 4 and 8 oz. sizes by the Trico Fuse Mfg. Co., Milwaukee.



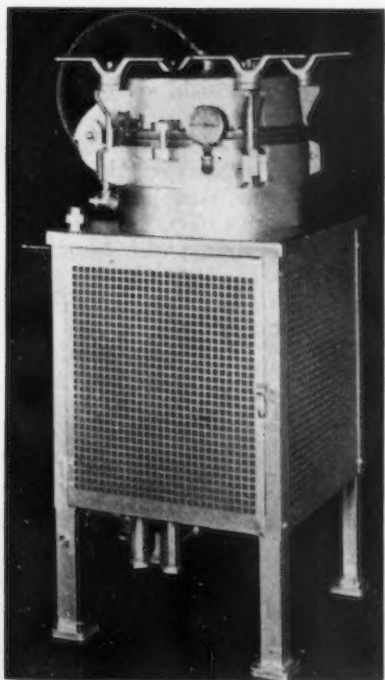
MODEL J-R heavy duty Hypressure Jenny is a new size of steam cleaning unit manufactured by Homestead Mfg. Co., Coraopolis, Pa. Pressures up to 150 lb. per sq. in. are generated within 1½ min. through a pressure atomizing fuel oil burner and a coil type vapor generator. An extra heavy duty model J-H is another addition to the line of portable units for cleaning industrial machinery and structures.



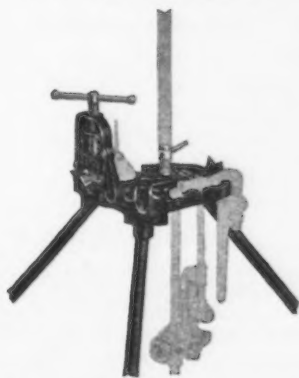
GITS brass oil gage plugs are available in two styles, the BW Hex with threaded shank, and the CW flanged oil gage (shown) for flush mounting. The body is turned from solid brass rod, and all parts are individual and replaceable. Four unbreakable socket head screws hold this unit firmly in place and guard against leakage. The CW units come in range of sight diameters from ¾ to 2 in., while the BW bodies have a sight diameter of 13/16 to 2 in. Made by Gits Brothers Mfg. Co., 1846 S. Kilbourne Avenue, Chicago.



OIL and oily substances, as well as suspended solids can be removed from mill water before discharge into the sewer by the Gale liquid separator, which operates solely by gravity. Baffles tend to throw the solids to the bottom in the form of sludge while the lighter liquids are floated to the top and are drawn off continuously by a pipe at the side. The top of the casting is open to the atmosphere and is merely covered by a coarse screen. This unit may also be used on intake water, as a pre-separator before a filter unit. It is made by Gale Products Co., 50 West Street, New York.



LIKE the larger units made by the Hilliard Corp., 36 West Fourth Street, Elmira, N. Y., the new model B Hico oil reclaimer is continuous and automatic in operation. Attention is required only once a day. Capacity ranges from 6 to 50 gal. per day, depending upon the type of oil being purified. The process consists of filtration through a bed of highly adsorbent clay to remove all solid matter such as sludge, carbon, abrasives and dust. Acidity and color are also favorably restored. Moisture and fuel dilution are removed by evaporation under vacuum in a chamber electrically heated and thermostatically controlled.



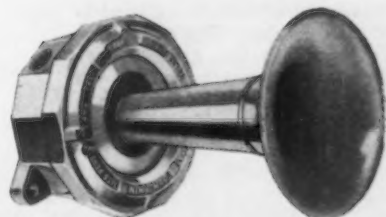
THE legs of this Tri-Stand pipe vise are hinged at the tray so that they can be folded compactly together for carrying. When set up, they give perfect balance. Unit is equipped with adjustable screw for ceiling brace and has a pipe rest and three sizes of pipe benders. Vises are available in 2½ in. yoke and 4 in. chain patterns. Made by Ridge Tool Co., Elyria, Ohio, this maintenance tool is being distributed only through supply houses.



SEVEN sizes of rigid conduit pipe, ranging from 1¼ to 4 in., can be bent by means of a simplified one-piece bending ram and 20-ton hydraulic jack in this new model S-36 Porto-Power pipe bender, made by the Blackhawk Mfg. Co., Milwaukee. Pull pins are used for fastening the rotating pivot shoes, which have wide rims which act as wheels for rolling the unit along smooth floors. A model S-30A pipe bender is also made with 10-ton jack for bending 1 to 2 in. conduit.

BELOW

NEW combination of tone and pitch in conjunction with an improved amplifier gives this new Benjamin industrial Howler 100 per cent increase in audibility without increase in current consumption. New types of form wound coils are used. The entire assembly plugs into a base socket, making replacement simple. The unit is readily disassembled through means of a threaded rig which seals the operating unit against dust and moisture. These Howlers are made by the Benjamin Electric Mfg. Co., Des Plaines, Ill., in weather-proof and non-weatherproof designs, with single and double projectors or in a grill type model.

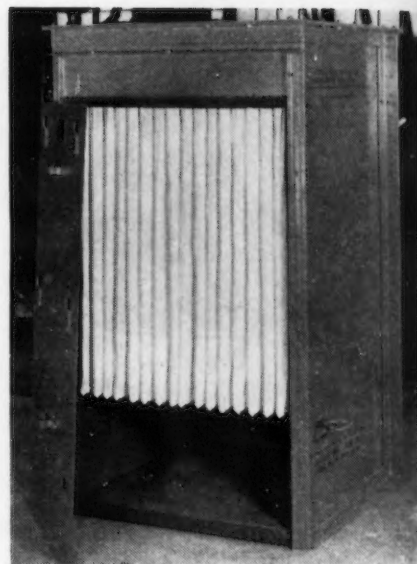




WESTINGHOUSE type S Precipitron power pack for industrial air cleaning by electrostatic precipitation is arranged for installation of from one to 12 Precipitron cells of 8 x 36-in. cross-section, each cell having a cleaning capacity of 375 cu. ft. of air per min. Type L size is for 12 to 50 cells. Power packs consist of high reactance transformer, rectifier tubes, a capacitor, indicating system and cabinet as illustrated.

and rating. When a No-Bonnet-Joint is welded in the line, the only joint is that of the stuffing box for the stem. The valve may be easily disassembled in the line, however, for regrinding. These valves are made in one basic size and are tapped or bored (for welding) for $\frac{1}{2}$, $\frac{3}{4}$ and 1-in. pipe.

THE Kennedy Valve Mfg. Co., Elmira, N. Y., announces a new line of bronze globe and angle valves with plug type seats and renewable rings for close control in throttling service and for general heavy duty. The plug and ring are both of copper-nickel alloy, the seat being harder than the plug. Stems have Acme standard threads and have a rounded stem head to permit self-centering of the plug. Bonnets are provided with heavy union bonnet rings and have a machined seat on the undersurface to permit repacking the gland under full line pressure when the valve is wide open. These valves are made in sizes from $\frac{1}{4}$ to 2 in. for 200 lb. steam at 550 deg. F. and 400 lb. cold water, gas or oil, non-shock; and in sizes from $\frac{1}{4}$ to 3 in. for 300 lb. steam and 600 lb. cold water, non-shock.



LOW priced, Economy dust filters, small enough for individual machine application or auxiliary to larger dust collector systems, are announced by the W. W. Sly Mfg. Co., Cleveland. These units are made in four sizes, with a net cloth filtering area ranging from 88 to 352 sq. ft., handling air volumes from 350 cu. ft. per min. and under, up to 1500 c.f.m. respectively. The flat cloth bags are shaken by hand lever to remove any clinging dust.

Lubrication System

cock Valve Division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn., has developed a new type of steel valve with no bonnet joint. These valves are made for pressures up to 2500 lb. per sq. in. at 1000 deg. F., and are claimed to weigh less than a fourth as much as a conventional bolted bonnet valve of the same size

UNIT, pressure lubricant circulating systems, known as Unilube systems, have been developed by the DeLaval Separator Co., 165 Broadway, New York, for application to gear drives, large mill motors, roll neck bearings and other machinery for which force feed, pressure lubrication is desirable. The Unilube is available in three types—single, double and

dual—all of which are designed to handle the full range of oil viscosities up to 2400 S.S.U. at 100 deg. F. The capacity of each type ranges from 1 to 30 gal. per min. The Unilube is complete with baffles, level gages, dial thermometer and steam heating coil thermostatically controlled, pressure filter and pumps, all mounted as a



IN the Dependon safety shield, the window material is synthetic, made to withstand heat, sparks and acids, and is supported well off the face for proper ventilation. Headband is instantly adjusted to fit any cranium. The maker, the Sellstrom Mfg. Co., 615 Aberdeen Street, Chicago, recommends this shield for a wide variety of shop operations, from grinding and chipping work to acetylene welding.



THREE types of face shields can be buttoned on the fiber forehead guard and spark deflector of this safety device, made by Boyer-Campbell Co., Detroit. At left is a screen guard for protecting the face against heat and spatter of hot metal, while at right is the conventional welding helmet. In the center, a Plastacele window is shown buttoned in place. These windows, aluminum bound, are available in clear, light, medium or dark green, and amber, for spot welding, wire brushing, die casting, etc.



A SPECIAL cellulose material absorbing about 20 times its weight in water is used in a new style of sweatband, recently introduced by O. Hommel Co., Pittsburgh. Before use, the sweatband is soaked in water and hand squeezed. It is easily washed with soap and water.



A COMFORT cushion pad, molded from soft sponge rubber, has been developed by the Chicago Eye Shield Co., 2300 Warren Boulevard, Chicago, to alleviate the discomfort of wearing goggles with plastic eye cups in the presence of intense radiant heat. The rubber pad insulates the plastic goggle from the wearer's face, preventing blister and burns. Pads can be sterilized and readily replaced.

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unit on a welded steel tank. Filtration is automatic and mechanical.

Metal Cement

A NEW steel and metal cement known as Fer-On is being distributed by L. B. Lincoln, 9 South Clinton Street, Chicago. It is said to tighten loose nuts, anchor screws, to expand and contract with castings, and set and harden like iron.

Diesel-Electric Set

MODEL 46-30 power plant of 30 kw. capacity, recently announced by Caterpillar Tractor Co., Peoria, Ill., has a six-cylinder diesel engine for drive. All electric equipment is inbuilt, except the circuit breaker. Engine has only three operating adjustments, none of which involve the fuel system. Generator is of single unit construction, equipped with ball bearings. Built-in regulation enables the set to pick up large motor loads with little voltage drop. A voltage regulator is not necessary.

Floor Re-Suracer

FOR renewing concrete, metal, rigid wood flooring or asphalt mastic floor, the Rock-Tred Co., Inc., 629 West Washington Street, Chicago, is offering a new premixed floor surfacing material known as Rock-Tred. It can be used indoors or out in any thickness from 1/2 in. to a fea-

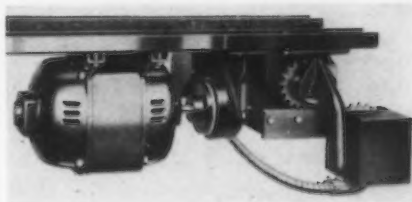


SIZE and shape of the lenses in the new M.S.A. All-Vision facepiece are such that the wearer's normal vision is unrestricted, without having excess glass surface to pick up reflections. The dead air space has been reduced, thereby cutting down rebreathing of exhaled air. Incoming air stream is directed over the lens, preventing fogging. Facepiece is of soft molded rubber, giving a good fit without undue pressure on the headbands. This product of the Mine Safety Appliances Co., Pittsburgh, has Bureau of Mines approval.

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ther edge. This re-suracer cures in from 8 to 12 hr. and gets harder with age, although use is said to smooth out surface abrasions. The top surface attains the hardness of concrete, but the interior maintains a gum-like resilient structure. Rock-Tred is also

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CENTRIFUGAL clutch, electromagnetic brake and worm gear reducer are featured on the Barber-Colman model MC electric operator for overhead type doors. A safety feature is that the attendant must hold the "close" button throughout the entire closing stroke; should he remove his hand from the button, the door will instantly start back to the open position. To open the door, however, the "open" button need only be depressed for a second.



SKIN-A-Cat respirator, made by H. S. Cover, South Bend, Ind., has 40 sq. in. of filtration area. Filters resemble miniature sofa cushions and always stay flexed. They are held in place by adjustable tubular connections. The filters are sewed together in the conventional manner, then turned inside out, giving them a well inflated appearance, and making them non-collapsing. Approved for type A dusts by Bureau of Mines.

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said to resist heat, fire and acid. Installation is simple.

Safety Goggles

FUL-VUE safety goggles are now being supplied by the American Optical Co., Southbridge, Mass., with a new double braced bridge, soldered at four places to the lens frame, in place of the usual two. The added rigidity gained means that the goggles will stay in proper adjustment longer under most strenuous daily handling. To secure more exact fitting of the goggles to the individual worker, they are now offered in three eye sizes of 44, 47 and 50 mm. and three bridge sizes of 21, 23 and 25 mm. between lenses. The styling has also been improved.

Treatment for Burns

THE tannic acid treatment for burns, has been made available for use in first-aid work by the Davis Emergency Equipment Co., 55 Van Dam Street, New York. The Davis preparation, known as Tannoid, consists of a water-soluble jelly containing the proper proportion of tannic acid. When applied to the burn, it relieves the pain, lessens the toxic effect, and reduces the formation of scar tissue, according to the manufacturer. It is easily and painlessly removable, if further treatment is required. Tannoid is supplied 5 and 1 1/2 oz. tubes, and in unit cartons containing six 1/8 oz. tubes.

THIS WEEK ON THE

By W. F. SHERMAN
Detroit Editor

ASSEMBLY LINE

... Adequate supplies ready for Chrysler to resume production after strike ... Stored steel to be used in first quarter auto production ... Assemblies follow usual pattern; up slightly to 86,700 ... Anti-trust conviction to affect Big Three financing arrangements.

DETROIT—As final points were being settled in the Chrysler strike negotiations, moves were underway to provide the company with adequate supplies of materials, parts and production tools for the resumption of production. Early attainment of something in the neighborhood of 20,000 units per week from all Chrysler plants is anticipated because Chrysler naturally will attempt to recoup as much as possible on the sales lost during the strike.

Production tools in considerable volume were processed in the last two weeks with many scheduled for delivery during last week when the first glimmer of labor peace was seen. An assisting factor in prompt resumption of shipments on perishable tools is the fact that the first rush of the season is well past so plenty of capacity was available for taking care of Chrysler requirements which had hardly been taken care of when the strike started.

Parts manufacturers have in most cases gone ahead with the production of substantial quantities of Chrysler requirements, the strike having offered them a breathing spell which enabled them to take care of all their other customers adequately and then proceed to anticipate Chrysler needs.

Clarifies CIO Issues

All suppliers have felt an obligation to Chrysler because there is a general feeling that this firm is helping to clarify CIO issues which sooner or later would have to be cleared up by some such action as Chrysler has taken. Chrysler is understood to have asked suppliers to provide sufficient inventory so its plants could go into full production as soon as the strike settlement was reached.

Thus it is not surprising that in this situation which has prevailed generally steel companies should be accumulating tonnages and holding them for shipment to Chrysler. It is understood that this material has now been piled up to the point where it might take care of Chrysler requirements for several months, and there appeared a probability that, if the strike were prolonged, this steel might cover Chrysler during a considerable part of the first quarter. This brings up the subject of price. But impartial investigation would indicate that the matter has been approached thoughtfully and without favoritism.

The highly competitive automobile industry has already analyzed all of the possibilities and probably reached its own conclusions by now. This has led to inquiries which brought from an authority the suggestion that steel shipped to any customer after Jan. 1 will bring the official first quarter price, whatever that may prove to be when announced. This indication from the steel trade gains credibility because the same attitude is expressed by all steel men who are in contact with automobile plants in Detroit and vicinity. It is to be assumed that Chrysler is making arrangements to take title to this stored steel by Dec. 31.

60 Per Cent of Steel Ordered

Without doubt, whatever the actual circumstances of delivery, Chrysler will be using some of this steel in the first quarter of next year. But every other automobile manufacturer will do the same. It is pretty widespread information by now that the auto industry has on order 60 per cent of its 1940 requirements—and certainly will not have produced 60 per cent of its 1940 cars by the first of the year.

Therefore, the circumstances are the same for all automobile manufacturers, even Chrysler, except that under the circumstances of the strike there have been difficulties in completing verbal or written contracts about delivery.

Assembly lines for all of the industry except Chrysler are now producing at what is nominally considered standard output for the fall season, so production totals for the last week show only a minor change from the previous week. The total moved up slightly to 86,700, compared with 86,200 in the preceding period, and 96,735 in the corresponding period a year ago, according to Ward's Automotive Reports. Ford showed no change from the previous week's production of 22,000 units, although Lincoln-Zephyr figures for the week were 615, compared with 600. Chevrolet was responsible for most of the gain in the industry, with a result that total General Motors volume rose to 48,180 units from 47,630 in the previous week. The Chevrolet increase was an even 500, to 28,000.

G-M Officials Acquitted

Conviction of General Motors Corp. and three affiliates on charges of violating the Sherman Anti-Trust Act apparently will make permanent the consent decrees which Ford and Chrysler signed a year ago, on Nov. 15, 1938. Under these consent decrees the two competitors were pledged to avoid the same kind of financing arrangements and coercion of which GMC has been convicted.

All three of the companies were indicted in May, 1938, and accused of certain acts of coercion by forcing dealers to give installment sales paper to specified affiliate finance organizations.

The General Motors conviction included General Motors Acceptance Corp., General Motors Acceptance Corp. of Indiana, and General Motors Sales Corp. Fines of \$5,000 each were imposed on them by Federal Judge Walter C. Lindley at South Bend. The jury acquitted seventeen officials

CUT MASTER

POWER TRAVERSE OF ALL MAIN HEADS

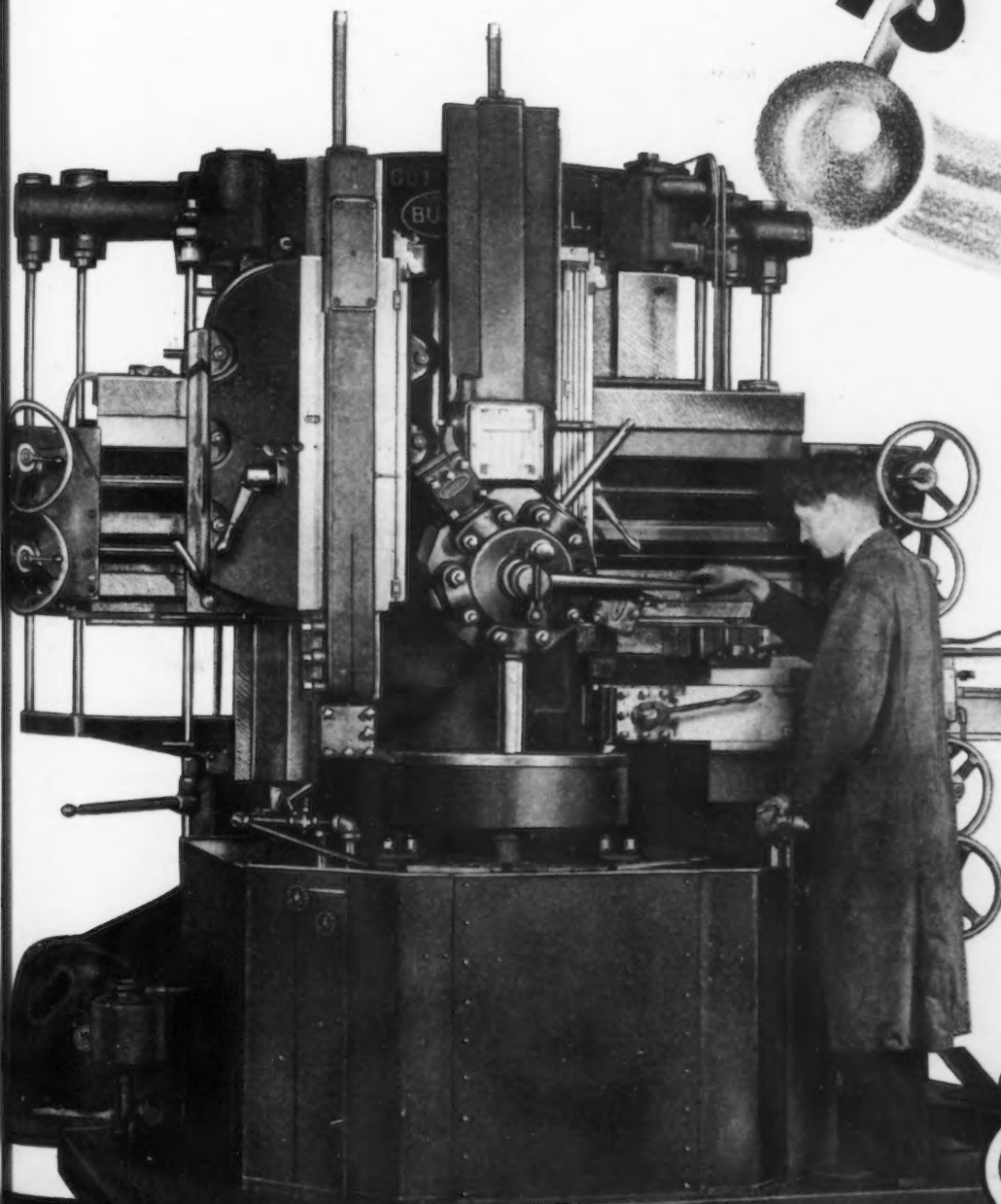
To cut machining time is only part of the machine tool builder's job. The other part is to cut the idle time between operations.

That's the reason why Cut Master has 100% rapid power traverse. Both main heads, both their rams, the side head and its ram can be rapidly moved simultaneously according to the need of the moment in any vertical or horizontal direction. Cut Master cuts idle time.

This is only one of the many reasons why Cut Master has been "clocked" on various jobs at one-half to one-sixth the time of ordinary turret lathes. Frankly, Cut Master must be seen to be appreciated. Make arrangements to see these machines in actual operation.



CUTS TIME



CUT MASTER CUTS TIME

16 feeds: .0026" to .500".
20 table speeds. Sufficient speed and power at point of cutting to take full advantage of carbide tools.

CUT MASTER ACCURACY . . .

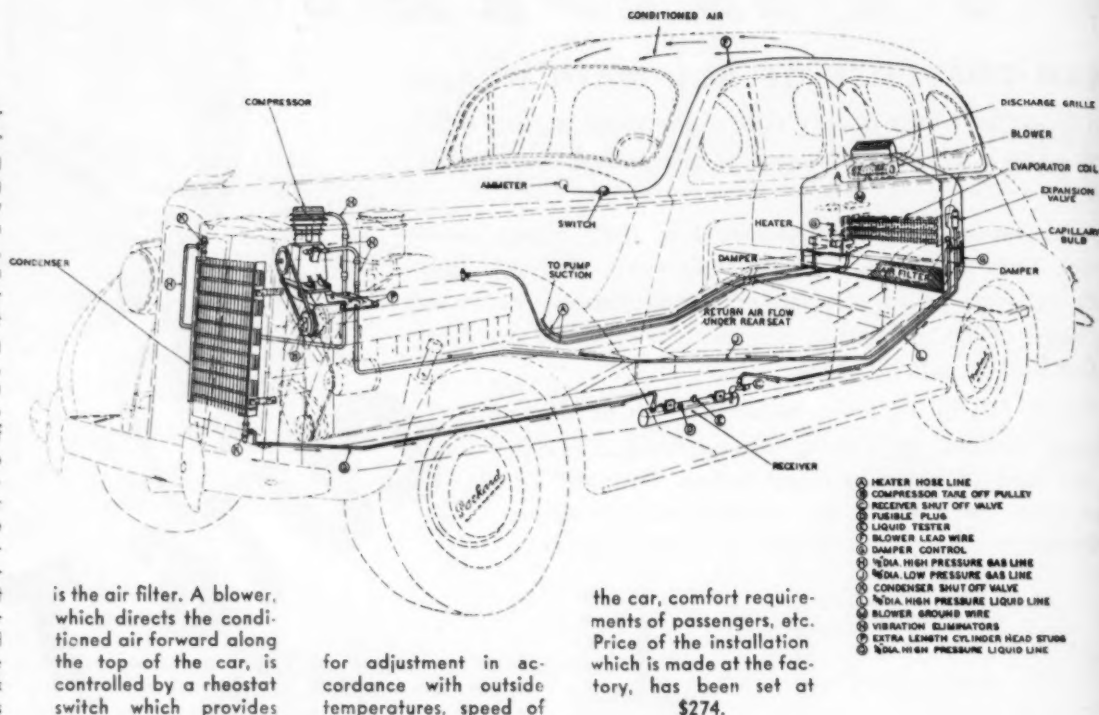
Screw feeds of rail heads in all directions assure accuracy of thread cutting and fine finish. Heavy Timken Spindle Bearings. Positive pressure lubrication. Inbuilt Accuracy produces Accuracy.

BULLARD

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

A COMPLETE automobile air conditioning system including refrigeration or cooling has been announced by Packard. The installation is shown in the diagram, while the photograph shows the compressor which is driven by a belt off the engine cooling fan. A heater hose line, with a return line, is run from the engine block to the heater in the rear of the car and a line also runs from the compressor to evaporator coils in the rear of the car. This unit has a return line to the condenser located in front of the regular radiator coil. Both heating and cooling elements are contained in duct work behind the rear seat, as



is the air filter. A blower, which directs the conditioned air forward along the top of the car, is controlled by a rheostat switch which provides

for adjustment in accordance with outside temperatures, speed of

the car, comfort requirements of passengers, etc. Price of the installation which is made at the factory, has been set at \$274.

who were individual defendants. New trial has been denied and arrest of judgment refused, but 90 days has been granted as a period for filing

exceptions on which an appeal may be made to the United States Circuit Court of Appeals at Chicago.

Both Buick and Oldsmobile have

denied that the Olds' Hydramatic Drive will be incorporated in 1940 Buick models. D. E. Ralston, general sales manager of Oldsmobile, declares that the story published in the *Assembly Line* on Nov. 2 is unfounded and Buick has issued a memorandum to its dealers and distributors, informing them that the clutchless driving unit is not scheduled to be used in their line of cars.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



New \$500,000 Plant in Ohio

M^T. GILEAD, OHIO — Officials of Hydraulic Press Mfg. Co. look forward to construction of a new \$500,000 plant, following approval by stockholders of preferred stock and ten-for-one split-up of present common stock. A registration statement on the proposed issue of 26,400 shares of 6 per cent cumulative convertible preferred and the common stock split will be filed with the Securities and Exchange Commission soon, said Howard F. MacMillin, president.

SAE Annual Meeting Jan. 15-19

J^{AN}. 15-19 has been selected as the date of the 1940 annual meeting of the Society of Automotive Engineers, according to John A. C. Warner, general manager. The meeting's 20 technical sessions, the SAE Engineering Exhibit, and the annual meeting dinner are to be held at the Book-Cadillac Hotel, Detroit.

How to INCREASE THE PRODUCTIVE CAPACITY OF YOUR PRESENT MACHINE TOOLS

... with one simple change



PHOTO, COURTESY
WARNER & SWASEY CO.

- WHEN** you need more production, *FAST*—
- WHEN** new equipment is not immediately available—
- WHEN** extra man power and extra hours of work fail to meet increased demand—

WHAT WILL BE YOUR ANSWER?

If your plant has this problem to meet—
and your production involves machining
work—Carboloy tools may provide a
means of obtaining an immediate
production increase on many of your jobs.

There are two ways in which Car-
boloy tools can step up production on
your present equipment. Reduced



cutting time per piece, through higher
speeds, is one way. More continuous pro-
duction per hour—through longer tool life
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be the answer in your particular case.

Carboloy representatives will be
glad to help you get this extra capac-
ity out of your present machines.

✓ Cut Steel with Carboloy. Send for Instruction Bulletin GT-120

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CARBOLOY CEMENTED CARBIDE TOOLS

THIS WEEK IN WASHINGTON

*... TNEC steel hearings close, will reopen in early January
... New Deal advisers unable to force pledges on first quarter prices ... Government contracts for steel in latest reported week \$765,305.*

By L. W. MOFFETT
The Iron Age

WASHINGTON—Bringing the TNEC steel inquiry to a close last Wednesday — just two weeks to a day after the hearings started Nov. 1—members of the Temporary National Economic Committee expected a report by the Justice Department on the steel investigation and the opening of the second phase of the steel inquiry early in January as the next developments in its treatment of the steel industry.

Ending in sharp contrast to its beginning two weeks ago, the closing session found few spectators on hand to hear A. H. Feller, Justice Department representative who directed the inquiry, and special assistant to the Attorney General, announce briefly that he appreciated the committee's patience during the sessions. No other announcements were made. Although Leon Henderson, former executive secretary of the committee and now a special TNEC coordinator and a member of the Securities and Exchange Commission, continued to participate in the questioning to a greater degree than any other single member, he made no final analysis or "impromptu running characterization" as he did when the representatives of iron ore companies finished their testimony on Nov. 3.

Bash, Schroeder Testify

On the last two days of the hearings last week, the committee heard testimony from S. M. Bash, member of the Steel Export Association of America, and manager of the Bethlehem Steel Export Corp., and Henry Schroeder, New York district sales manager of the Wheeling Steel Corp.; T. A. L. Loretz, general manager of

the Pacific Coast Fabricators' Association; and John E. Goble, vice-president in charge of sales, National Tube Co.

Mr. Bash strongly opposed repeal of the Webb-Pomerene Act, pointing out that the law had afforded steel manufacturers an excellent share of world markets. He stoutly denied that any activities sponsored by the association were in violation of the law, as charged by several members of the committee. Mr. Loretz urged the establishment of additional basing points for mills on the Pacific Coast and protested against abuses which he said had developed under the system of fabrication-in-transit. Mr. Goble laid at rest reports that National Tube had withdrawn prices of Grade B seamless tube, insisting that they remained at the level of lapweld prices—a statement which was prompted by reports that the Grade B seamless price had been withdrawn six days after it was established in September, 1938, to meet lapweld competition. Explaining the company's purpose was to see that Grade B should be used only for shallow oil wells, Mr. Goble testified that the company merely had withdrawn earlier instructions and now requires district offices to report Grade B requirements to the Pittsburgh office for consideration.

Steel Export Association

In taking up the subject of steel exports inquiry was made on the position of United States steel manufacturers through membership in the Steel Export Association of America. Mr. Bash explained that the association was organized in 1928 under the Webb-Pomerene Act, in order to permit American exporters to meet foreign

competition and share more widely in world markets which are divided between European makers who operate under a cartel system. Prices are also agreed upon, Mr. Bash said, since the Webb-Pomerene Act grants exemption from the anti-trust laws, with certain exceptions.

The act prohibits association agreements in restraint of trade within the United States and in restraint of the export trade of any domestic competitor. Also it prohibits any agreement which enhances or depresses prices or substantially lessens competition within the United States.

Mr. Bash listed the following as members of the Steel Export Association: Armco International Corp., Inland Steel Co., Jones & Laughlin Steel Corp., Newport Rolling Mill Co., Pittsburgh Steel Co., Republic Steel Corp., Spang, Chalfant & Co., Weirton Steel Co., Wheeling Steel Corp., Youngstown Sheet & Tube Co., United States Steel Export Co. and the Bethlehem Steel Export Corp.

Foreign Markets Divided

Mr. Bash told the committee that since passage of the Webb-Pomerene Act, American steel producers who belong to the export association have been successful in making arrangements with European manufacturers to get an excellent share of the world's steel business at a fair price by dividing up foreign markets based on performance in previous years. He told Mr. Feller that it would definitely be advantageous for American producers to continue under the cartel system. Replying to a question by Senator King, Mr. Bash said the Webb-Pomerene Act has justified itself and it would be harmful to them if the act were repealed.

In addition to citing the benefits under the Webb-Pomerene Act, Mr. Bash told the committee that it is necessary to permit American producers to organize to meet competition from foreign purchasing agencies, such as those set up by the Allies since the recent European war broke out. In this way, it was stated, American producers will be able to reduce the selling cost and keep in closer touch with the demands of the foreign markets.

Mr. Bash traced in detail former agreements on numerous steel products that had been made with European cartel members. He said a proposed

"We light-conditioned our office to provide comfortable, easy seeing with G-E MAZDA LAMPS"



ABOVE—300 watt G-E Silvered Bowl MAZDA lamps in modern fixtures direct light to the new style steel ceiling, which re-directs it downward on the desk tops where the intensity is more than 20 foot-candles.

* * *

AT RIGHT—G-E Silvered Bowl MAZDA lamps are regular MAZDA lamps with a coating of "mirror" silver on the bowl. Like all G-E MAZDA lamps, these silvered bowl lamps stay brighter longer.



R. J. HIMMELRIGHT, *treasurer of Monarch Rubber Company, tells how simple it is to have BETTER LIGHT*

"AFTER being handicapped by bad lighting for years, we were surprised to find how simple it was to make our office a comfortable and easy place to work with better lighting," says Mr. Himmelright of the Monarch Rubber Company, Hartville, Ohio.

An interesting feature of the new lighting installation is a new steel ceiling construction which directs the light from the fixtures downward in parallel beams. Thus a maximum of the available light falls on the working area. In addition, what light does strike the side walls is well diffused because of the good reflection quality of the color used on the side walls.

Work goes easier and faster in a light-conditioned office like this. Fatigue is reduced. Efficiency is increased. For a free copy of a valuable booklet, "Light for Seeing in the Office," write General Electric Company, Dept. 166-IA-K, Nela Park, Cleveland, Ohio.

G-E MAZDA LAMPS
GENERAL ELECTRIC

international tin plate agreement, to run from June 26, 1938, to June 30, 1941, was never signed owing to the war. A third international rail agreement, beginning Aug. 1, 1935, will expire July 31, 1940. Tentative agreements, it was stated, were negotiated with regard to heavy and sheet products. Heavy products included were semi-finished steel, bars, plates, structural shapes, wire rods and skelp. In the sheet agreement were galvanized and black sheets, hoops and strips.

Mr. Bash said export prices are supposed to be identical based on general conditions and some competition and are determined by committees from the different groups of production which make recommendations to their boards of managers. Prices, it was stated, are quoted on the basis of exchange in the country controlling given markets. Members are allowed to sell below fixed prices, the committee was told, if they have "deficits"—tonnages below their allowed quotas—and are penalized when quotas are exceeded. Members of the American association, Mr. Bash said, are responsible for quota excesses whether sales are made by members or non-members.

Referring to the fact that American exports in 1937 were much greater than those of 1938, Mr. Feller asked if the American producers shouldn't attempt to use exports as a "compensating mechanism wherever possible to take up the slack which domestic conditions may bring about."

"Possibly, provided you are able to stand the gaff," replied Mr. Bash. He said that 1937, unlike 1938, was a sellers' market because European producers had diverted much of their output to home markets.

Differences Are Cited

Mr. Feller inquired if American producers weren't deliberately, by virtue of the agreements, placing themselves in the position where they could not "follow this desirable policy of expanding exports in order to take up the slack which was inevitable in 1938." Mr. Bash answered that no one year can be singled out as an over-all policy.

Intermittent differences between foreign and American makers over prices and quotas were cited by Mr. Bash.

Mr. Feller submitted a letter of Feb. 7, 1938, written by Mr. Schroeder, and addressed to J. L. Neudoerfer, vice-president and general manager of sales of the Wheeling Steel Corp., saying that the European cartel urged American sheet makers to join the cartel as an alternative to lower export prices

and invasion of the American market.

The Earl of Dudley spoke for the foreign group, and, the letter said, reminded the United States Steel Corp. and the Bethlehem Steel Co. that they had made an arrangement in February, 1937, conditional upon the later formation of a sheet group, that the International Cartel felt that the American agreement had not been lived up to, and that the formation of a sheet group was a necessary part of the American agreement. The foreign steel interests, it was stated, told the American companies that the former "had come over here to find out for themselves the reason for the delay, and if matters were not buttoned up by Wednesday next, when they intended to return on the *Queen Mary*, the International Cartel would take drastic steps toward lower prices and throw the world markets open."

Mr. Schroeder said that "the inference was plain that such a low level of export prices would probably result in foreign makers attempting to share in the large and relatively high priced American market." He added that discussion of the point was discouraged by members of the American group on the plea that they had only come prepared to discuss export matters.

Hard to Control Outsiders

Mr. Bash, spokesman for the American group, the letter said, explained that the Steel corporation and Bethlehem had lived up to their engagements but that the difficulty lay in their inability to control the outsiders "and to date their inability to bring the outsiders together in a steel group."

Mr. Feller asked if the inference of the foreign delegation that it would enter the American market had operated as an inducement to the American producers to conclude the agreement. Mr. Schroeder replied in the negative.

Mr. Bash said that even if the foreign delegation had threatened to invade the American market he would not take the threat seriously.

The steel export testimony largely revolved around a letter written in November, 1938, by C. E. Masters, of the Bethlehem Steel Export Corp. to John Outwater, who at that time was in charge of the Steel Export Association of America.

The letter, which took the form of a suggested communication to be sent to the Export Association's representative in London, mentioned business being lost by the cartel to non-member mills in the Philadelphia district,

pointed out that the "sooner these mills are eliminated from taking business the better our chances will be of bringing them under control in our own group," and contained the inference that the members of the cartel had been seeking to eliminate the American outsider by getting foreign dealers to quote lower prices via the rebate system.

Non-Members Busiest

Denying the implications contained in the letter, Mr. Bash told Mr. Feller that the cartel had assumed the responsibility for the entire bulk of export shipments covered by the agreement and that the responsibility carried heavy penalties. He explained that non-members could ship the entire allotment under the umbrella held over them and that all his organization was seeking was to ask the foreigners to carry on their part of the agreement or "to relieve us from the penalties," which he estimated amounted to a million dollars at the end of the first six months of operation because the foreigners did not maintain a price sufficient to maintain their quota position. Since the foreigners did not comply with the request to the extent asked, he continued, large sales were made by non-members so that they were actually exporting more steel than were the members.

Mr. Feller's interpretation of the letter, he emphasized several times, was that "your firm was asking the foreigners to cut their prices so as to drive the other non-members out of the market," but Mr. Bash steadfastly contended that it was not the expectation to eliminate anyone from the steel export business. He readily conceded, however, that the non-members were a disturbing element and told the committee that "we've done our utmost to get them to come in." He expressed doubt that the Federal Government should be empowered to compel outsiders to join the cartel.

"To be effective," he said, "the cartel must include as many producers as are interested in export trade. The nearer to 100 per cent membership we can get, the more we're going to get out of it. The Webb-Pomerene Act, of course, would permit a 100 per cent membership only on a voluntary basis."

Leon Henderson, who characterized the testimony as "helpful" and likely to be referred to when the TNEC takes up the cartel system in January or February, expressed the opinion that the letter reveals a type of arrangement prohibited by the Webb-Pomer-



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ene Act since the attempt, he reasoned, apparently was made to interfere with the action of those not entering into the cartel. Identifying the law as designed to give the same protection to non-members in the export trade as the Sherman anti-trust law gives to competitors in the domestic business, he observed that one important question involved is what additional protections are needed under the law. In Mr. Henderson's opinion, there is no hope for individual companies to get a substantial share of tonnage in the export market when "we're moving into a form of world business under group control."

"I am suggesting that perhaps something additional is needed in the way of standards," Mr. Henderson said, "so you won't be driven to the point where you are tempted to eliminate the outsider."

"We're not trying to eliminate," Mr. Bash answered.

"I am not so sure," was Mr. Henderson's reply.

After Mr. Bash said he believed the small companies stayed out of the cartel so they could get as much business

as possible while they remained under the protection of the umbrella, this question was posed by Mr. Feller:

"Suppose in the domestic business, mills in the Philadelphia area were selling below published prices in the California market, would it be proper for Bethlehem to ask the Steel corporation to eliminate the Philadelphia mills?"

Mr. Bash replied that his field was the export business and that he knew little about the domestic business.

Satisfied With Law

Referring to the close cooperation given by foreign governments to foreign cartels and citing instances where foreign governments are partners in the business, granting subsidies and sanctions by which they can treat their members, Mr. Henderson asked the witness if his group had not encountered decided difficulties because of the difference in treatment given cartels in this country. Mr. Bash readily agreed, but he said his group was perfectly satisfied to leave the Webb-Pomerene Act on the statute books as it exists today.

Establishment of additional basing points for mills on the Pacific Coast was recommended to the committee by Mr. Loretz, who testified that members of his group had "very pleasant relations" with officials of the Columbia Steel Co., United States Steel Corp. subsidiary and the Bethlehem Steel Co. but that their only quarrel was that the steel they buy is "not based on the cost of manufacture."

Mr. Loretz told the committee that it was not his recommendation that capital should be expended in building additional steel facilities on the West Coast but that he thought a proper price relationship could be developed by establishing additional basing points.

"I believe the only points that are not recognized at the present time anywhere in the country are the rolling mills in the Western states," Mr. Loretz asserted. "If the major steel companies see fit now or in the future to recognize their plants out there as basing points, pricing their products based upon cost of production there, plus a reasonable profit, the same as they have their plants everywhere else throughout the country, our situation would be considerably alleviated; in fact I would say that we would have no logical complaint."

Statistics Offered

Identifying his organization as a group of 26 companies engaged either in the fabrication of structural steel, the fabrication of plates, or both in the case of a few of the larger companies, Mr. Loretz put in the record a chart showing that in the three Pacific Coast states during the 18-month period ending June 30 this year independent fabricators were awarded a total of 41,597 tons of structural steel, or 27 per cent of the total tonnage of that class let for delivery or erection in the three states.

To Mid-West and Southern states independent fabricators went 5 per cent of the business, or 7685 tons, Mr. Loretz continued. While 2.4 per cent or 3688 tons went to so-called Atlantic States independent fabricators, and 101,277 tons, or 65.6 per cent went to so-called "mill affiliate fabricators," whom the witness described as "structural steel fabricators and sales units understood to be affiliated with major steel producers."

Characterizing this as "quite a bit less" than Pacific Coast fabricators should have received, Mr. Loretz gave two reasons for the result; (1) Because of the price structure, the Pacific Coast fabricator does not benefit from

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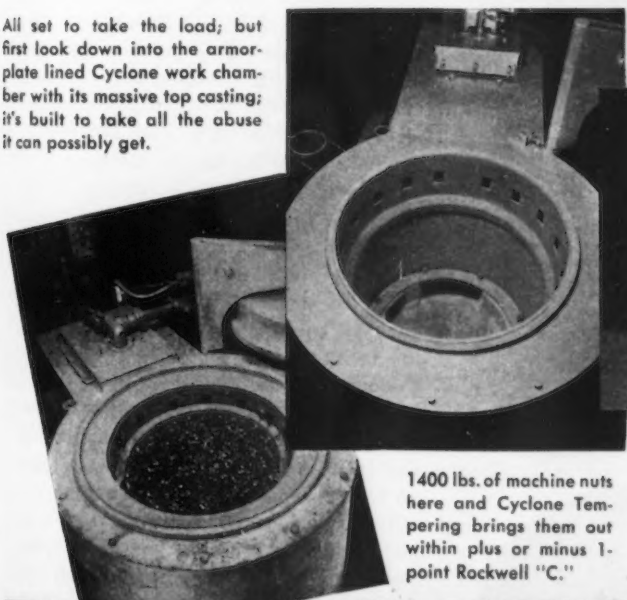
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the fact that steel plates, sheets and bars are produced on the Pacific Coast; and (2) even under the existing price structure the Pacific Coast fabricator would have difficulty doing business in these areas because of what he called abuses growing up under fabrication-in-transit.

Sees Abuses In f.i.t.

Describing f.i.t. as a privilege accorded by railroad transportation companies under which steel can be ship-

ped to an intermediate point for fabrication, thence to its ultimate destination with the cost of transportation based upon a through haul, plus a small charge for the stop-off privilege, Mr. Loretz emphasized that he was not protesting against the system when it is carried out legitimately but that his complaint was directed more specifically to abuses, including the practice of substitution.

With the explanation that railroads many years ago adopted the provision

in their tariffs permitting substitution of materials of substantially the same class at the transit point, on the theory that it was not impossible but was impractical to attempt to continue the identity of steel through the fabrication process, the witness pointed out that it is neither impossible nor impractical to continue the identity of steel through the fabrication process. But it is a custom of the trade, he continued, that substitution be permitted in railroad tariffs and it has continued on to the present time.

Comparing the function of the system with a case in which he cited a construction job in Phoenix, Ariz., Mr. Loretz told the committee that a Los Angeles fabricator, 395 miles away from Phoenix, cannot put his material into Phoenix at less than \$3.02 while a Birmingham fabricator, 2200 miles away, can put it there at \$2.67. The final result, he said, is to "eliminate the man in Los Angeles or any fabricator in California from any chance to do business even at a point as close to Los Angeles at Phoenix."

Process Is Described

Relating the process by which this is brought about, Mr. Loretz recounted that the Birmingham fabricator can register certain tonnage purchased from a mill in Chicago at the identical Birmingham price, registering that tonnage as so-called transit tonnage, and can then reship an entirely different tonnage of fabricated structural steel from Birmingham to Phoenix.

The witness explained further:

"And instead of paying the Birmingham to Phoenix lawful published railroad tariff rate he will be taking advantage of that 58c. per 100 lb. that he or the mill has already paid from Chicago to Birmingham, coupled with the fact that the rate from Chicago to Phoenix through Birmingham is the same as the Birmingham and to Phoenix rate, he can fix it so he will only pay transportation 52c. per 100 lb. plus an f.i.t. charge of $3\frac{1}{4}$ c., or total transportation cost of $55\frac{1}{4}$ c., thereby reducing his total landed material plus freight cost at Phoenix down to \$2.67 $\frac{3}{4}$ c."

In response to a question from Senator King, Democrat of Utah, and a member of the committee, who at times was critical of the testimony, Mr. Loretz asserted that the railroad loses about 55c. per 100 lb. under its normal transportation charge. He qualified his remarks by pointing out that "in all fairness" the man at Birmingham is neither technically violating the law nor the tariff. The prob-

RESPONSIVENESS



HELE-SHAW

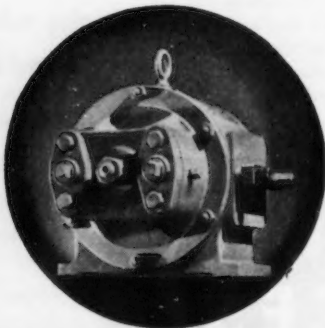
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lem surrounding f.i.t. he testified, was brought to the attention of the Interstate Commerce Commission a good many years ago but the commission never made a finding. He said that his organization plans to bring the subject before the ICC in a formal proceeding at an early date.

Mr. Feller referred to the subject of f.i.t. as one of "great complexities," adding that it was the hope of the Department of Justice to have a comprehensive report on the matter at some later date.

Although he said it was not his aim to argue for or against the delivered price system, Mr. Loretz explained that it was his purpose to show that prices of steel on the Pacific Coast are similar to those prevailing in the East, or in some cases higher, plus transportation costs. He added in this connection that it was his belief that steel produced on the Pacific Coast should be based on the cost of production and not on Eastern prices plus transportation costs. Recognizing that a full range of products are not made on the West Coast, Mr. Loretz said that he, of course, was only referring to products actually made in the West when asking that they be based upon the cost of production there.

Advantage to Larger Unit

At this point Mr. Feller interjected the remark that members of the association, in competition with the fabricating affiliates, believe that the pricing of steel has some significance. The American Bridge Co., he said, citing an example, could purchase steel from affiliates of the Steel corporation at the Eastern prices, fabricating it partially in the East and then bring it out West; whereas, he contended, the members of the independent fabricators association on the West Coast must buy it at the Western price and consequently may, in some cases, suffer as a result.

Mr. Feller observed that matters of transportation may only be theoretical because some of the steel is made on the Coast and to that extent the Western consumer is being penalized by a theoretical transportation charge. The problem concerning the related cost of manufacturing steel in the East and in the West, Mr. Feller said, is one in which the Department of Justice is extremely interested. He suggested that it would be "most constructive" if the United States Steel Corp. and Bethlehem Steel Co. would submit comparative cost figures to the committee when it resumes its steel inquiry in January.

Asked whether members of his as-

sociation have found themselves at a competitive disadvantage because of fabricating units maintained by the Steel corporation and by Bethlehem Steel, Mr. Loretz said he could give no specific case but called it "only natural that there should be a disadvantage where one company engages in the entire picture from the ingots right on through the rolling mill, the transportation and fabrication process."

Both Senator King and John V.

W. Reynders, consulting engineer who represented the Commerce Department at the hearings, reminded the witness that there were also disadvantages encountered by integrated companies such as investments involving the ore right up through the final stages of rolling the steel. Mr. Loretz agreed, insisting that he was not asking the committee for any kind of relief but that he was merely limiting his remarks to saying "that the major steel companies have that ad-



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vantage" and "we are not contending that they are abusing it."

"Your contention," said Senator King, "is that steel on the Pacific Coast by reason of the competition of Eastern producers is too cheap, and the producers of fabricated steel on the Pacific Coast ought to get a higher price. Is that what you mean?"

"I am afraid if that is what I did mean I wouldn't say it," Mr. Loretz replied. "However, that doesn't happen to be the case. Steel out there is apparently priced as shown by this exhibit, substantially the Eastern price plus transportation and is not price based upon the cost of production at the mills out there."

Mr. Goble, of National Tube Co., told the committee that National Tube had reduced the price of its then recently developed Grade B seamless tube in September, 1938, to the lapweld level because the company was losing its position in the market for the latter product, the price of which had been reduced twice in the preceding month. Grade B seamless was designed for shallow oil wells and to compete with lapweld tonnage. Mr. Goble said it is still the company's policy to sell Grade B seamless at the lapweld price. This statement was made in answer to reports that National had withdrawn the reduced Grade B seamless price six days after it was put into effect.

Mr. Goble recited at length his company's perfecting of the technique of seamless pipe production through technological development and improvements in each of its three grades. His explanation was made in response to an inquiry by Justice Department Attorney John W. Porter who asked why the company had reduced the Grade B seamless price to approximately the level prevailing for lapweld pipe. The reduced price on Grade B seamless upset the market for lapweld pipe, according to earlier statements made to the committee by officials of the South Chester Tube Co. and the Wheeling Steel Corp. F. H. Gibson, Pittsburgh district sales manager of the former company, said, "we were in a chaotic state and were faced with a condition where seamless pipe, admittedly of a superior quality, was being offered at the same price as oil well lapweld goods."

Reasons for Price Cut

Mr. Goble said that National put into effect in July, 1938, a price program to promote new simplified sizes and weights of seamless tubes. Oil operators in a newly opened Illinois shallow oil field, he said, had told company representatives that they could

use lapweld. Grade B seamless was offered in order to enter the Illinois field.

Mr. Goble said that he thought instructions to district office managers, issued in September, 1938, telling them they could accept orders for Grade B seamless at lapweld prices, were in effect about six days. He declared that apparently there was a misunderstanding in previous testimony as to the reason for withdrawing the instructions "because we at no time nor have we discontinued" the practice of supplying Grade B seamless at the lapweld price. In withdrawing the instructions, district offices were told, Mr. Goble stated, that all inquiries for supplying seamless material should be referred to the company's main offices in Pittsburgh. He explained there had been developments which the company had not foreseen.

Mr. Goble said that customers' engineers were delving seriously into National's new program because at that time the company was selling Grade B seamless some \$12 or \$13 below its Grade C seamless and customers began to revamp their program and devised a scheme whereby they would get 24-lb. Grade B seamless in place of the 22-lb. Grade C. The company, Mr. Goble told the committee, recognized that if it permitted this to be done it "would be faced sooner or later with an avalanche of claims and for our own protection we saw that we were getting ourselves in very hot water."

He went on to state that the company decided that the best thing to do was, regardless of what had been previously determined, to oblige district officers to take customers' requirements at destination and "submit them to the Pittsburgh office, where we know what the customers' requirements are, the (oil well) depths to which they propose to go and we would decide whether or not to accept" the order for Grade B on that basis.

It was then decided, Mr. Goble told the committee, to withdraw the instructions so far as district offices were concerned. He said the company, however, has not changed its policy of selling Grade B seamless at the lapweld price.

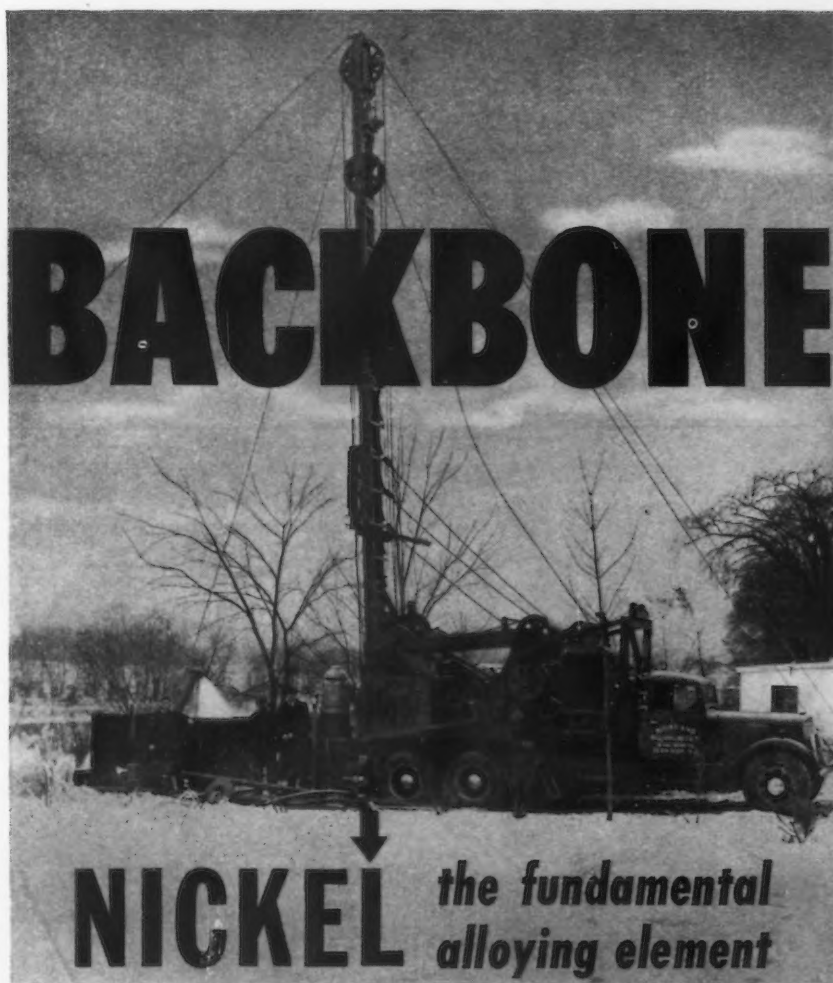
No Relation With J. & L.

Mr. Goble said that the National Tube Co. had no relation with the Jones & Laughlin Steel Corp. "or any one else" except the company and its customers in denying a report that National Tube had "raised Cain" because the Gulf Oil Co. had offered J. & L. and Spang, Chalfant & Co. orders for a barge load from each of

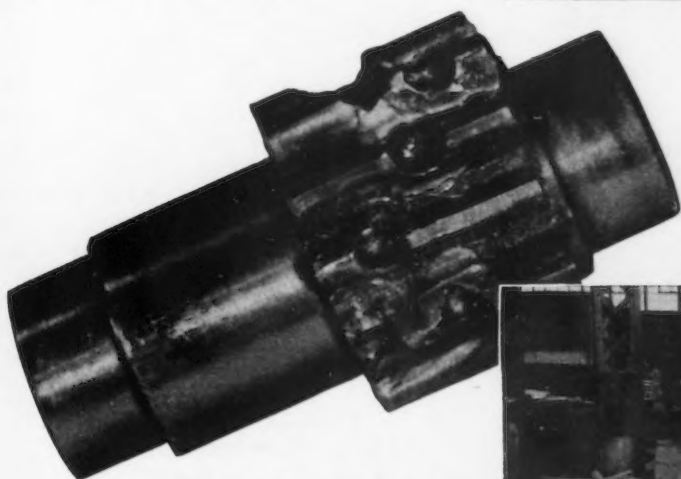
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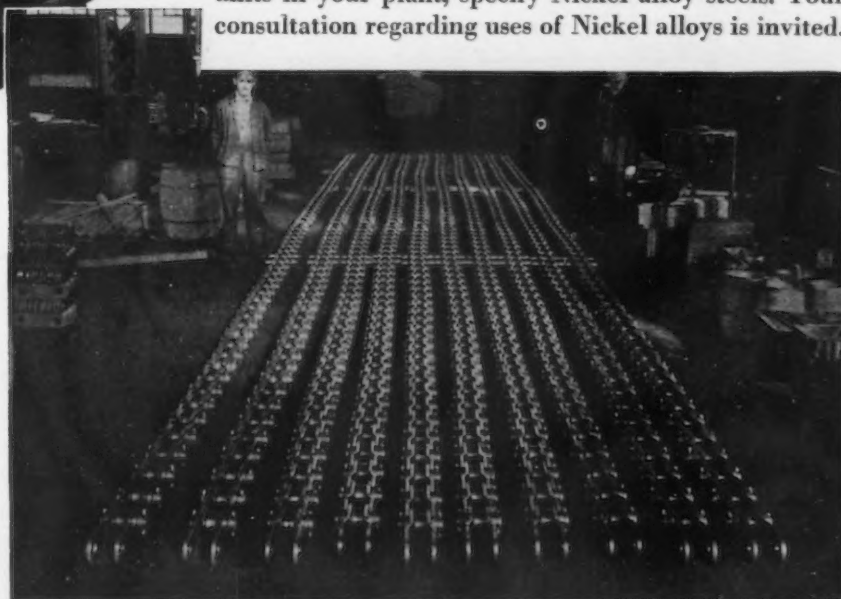


NICKEL *the fundamental alloying element*



After 12 years' service in an industrial truck this Nickel alloyed gear still retained toughness and ductility. The photograph shows how it battered but did not break when balls from a shaft bearing fell between teeth of gear and pinion. The gear is heat treated SAE 3135 Nickel-chromium steel, the same alloy specified today. Nickel alloy steels have backbone to stand up under long severe service. No wonder they prove so economical on a per-year basis.

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seamless pipe early in 1939 on an f.o.b. barge siding.

Mr. Goble said his company rejected an order offered by the Gulf company on an f.o.b. McKeesport, Pa., basis because National Tube sells on a delivered price basis and is not in a position to discriminate in favor of one customer or one method of transportation.

"The National Tube Co.," said Mr. Goble, "has not found it necessary in

conducting its business to confer with its competitors with respect to policy."

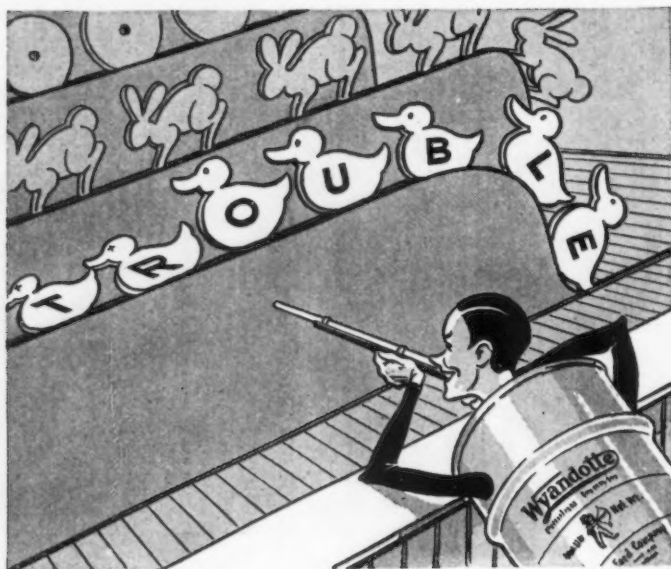
He told Mr. Porter that National can do nothing about acceptance of orders by competitors on a basis of f.o.b. mill or f.o.b. customer's dock.

Mr. Feller inquired if Mr. Goble felt that accepting the Gulf business on an f.o.b. mill basis, rather than on a delivered price basis, would affect the entire price structure as well as the entire policy of selling.

"Well, I would be concerned in this way," replied Mr. Goble. "We have a policy which is in general devised by not only our own company officials but by the United States Steel Corp. and, as far as I personally am concerned, when the officials of the United States Steel Corp. decide to make that policy I don't know as it makes much difference to me."

"You mean it doesn't make much difference in the National Tube Co.?" inquired Mr. Feller.

"To me as an individual, I shall pursue such course as is laid down with respect to general policy," replied Mr. Goble. "The practice of selling on a delivered basis is a matter of general policy of the Steel corporation and its subsidiaries. As long as that is in effect I shall abide by that and if it is decided to eliminate that practice I shall be glad to go along on that basis or any other basis."



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New U. S. Steel Film Shown in Washington

WASHINGTON — The new seven-reel sound film, "Making and Shaping of Steel," produced by the United States Steel Corp., was shown at the Wardman Park Hotel Theatre here last Friday night before a group of government officials and technical society representatives interested in available motion pictures. The film was produced to take the place of an earlier seven-reel picture, "The Story of Steel," which for years has been widely distributed among schools, technical groups, and other organizations by the United States Bureau of Mines. The new film, likewise, will be distributed by the Bureau.

Japan Aluminum Output 20,000 Tons in 1938

WASHINGTON—Japan, reported to be making progress in building up its aluminum industry, produced 20,000 metric tons in 1938, or approximately half of its domestic consumption in that year. Of the aluminum supplies imported into Japan, the bulk has come from Canada and Norway, with Switzerland and Italy also ranking as important suppliers. According to reports reaching the Commerce Department, the heaviest aluminum users in Japan are the war industries, especially airplane plants.

Foundries Used 36% More Scrap in 1939

INDICATED consumption of iron and steel scrap by all classes of foundries in 1939 was placed at 6,800,000 gross tons, an increase of 36 per cent over the 5,084,932 tons melted down in 1938, by Edwin C. Barringer, executive secretary of the Institute of Scrap Iron and Steel, Inc., New York, in addressing members of the Pittsburgh Foundrymen's Association Monday evening. Of pig iron, foundries this year probably will consume 4,340,000 tons, against 2,598,047 tons last year.

From 1935 to 1938, inclusive, foundries melted 25,364,440 gross tons of scrap, of which 13,451,240 tons was open-market scrap. In the same four years, foundry consumption of pig iron was 14,300,196 tons. This consumption of pig iron, according to Mr. Barringer, was 186,491 tons in excess of actual production of foundry and malleable iron during that period.

Of the metal requirements of foundries, 36 per cent consists of pig iron and 34 per cent of purchased scrap, or a total of 70 per cent which must be obtained in the open market.

T. C. I. Coal Output Up

AN increase in coal mining operations at Docena mine was announced today by the Tennessee Coal, Iron & Railroad Co. The mine at present is operating three single shifts per week but was to go on a five-shift week Nov. 20. On Nov. 27, night shift operation will be added. This increase will furnish additional employment for approximately 435 men.

Cleveland Utility Awards

CLEVELAND — The Cleveland Electric Illuminating Co., which has embarked on the construction of a new \$5,000,000 power plant here, announces the following equipment awards in addition to the 5000 tons of structural steel awarded last week to American Bridge Co.

Turbo generator to General Electric Co.; condensers to Worthington Pump & Machinery Co.; intake screens to Link-Belt Co.; boilers to Babcock & Wilcox Co.; pulverized fuel equipment to Combustion Engineering Co.; precipitator to Research Corp., and pipes and valves to Pittsburgh Pipe & Equipment Co.

Cleveland Purchasing Agents Celebrate 25th Anniversary

CLEVELAND—The 25th anniversary celebration of the founding of the Purchasing Agents Association of Cleveland was held Nov. 16 in the Cleveland Room of Hotel Cleveland with more than 40 members and guests in attendance.

Eight charter members were given special honor at the celebration, a banquet followed by entertainment. Leader among these was Holmes Mansfield,

the association's first president. There were 21 other past presidents present and honored.

Representing the National Association of Purchasing Agents at the anniversary celebration were Tom Jolly, Pittsburgh, national president, and George E. Price, Jr., Akron, vice-president of the sixth district. Both made short talks. Clarence Head of Aluminum Co. of America, Pittsburgh, was master of ceremonies. W. G. Winship, Cleveland, was chairman of the celebration committee.

"DYNO-MITE" DOUBLES PRODUCTION

MINIMIZES FATIGUE



They gave the little lady a rest . . . and found that she worked twice as fast. In the actual case pictured above, the slower hand-powered screw driver was retired from this assembly job, and the powerful, delicately-adjustable DYNO-MITE was put to work. Its ADJUSTOMATIC Clutch—exclusive Millers Falls principle—affords perfect torque control over a wide range; its high quality construction keeps its performance dependable. Aren't there a few girls in *your* plant who'd be glad to double their production with DYNO-MITE? Ask your supplier to arrange a free trial, and write today for further information.

Dyno-Mite
Screw Driver
10" long,
weight 3
pounds
Sure one-hand
control



MILLERS FALLS COMPANY GREENFIELD . . . MASS . . .

... THE NEWS IN BRIEF ...

Adequate supplies ready for Chrysler to resume production after strike. Stored steel to be used in first quarter auto production. Assemblies follow usual pattern; up slightly to 86,700. Anti-trust conviction to affect Big Three financing arrangements.—Page 58.

Hydraulic Press Mfg. Co., Ohio, to build \$500,000 plant.—Page 60.

Society of Automotive Engineers to hold annual meeting at Detroit, Jan. 15-19.—Page 60.

Seven-reel sound film, "Making and Shaping of Steel," produced by the United States Steel Corp., was shown to Government officials last Friday night.—Page 72.

Japan making progress in building up its aluminum industry with an output of 20,000 tons in 1938.—Page 72.

Foundries used 36 per cent more scrap in 1939.—Page 73.

Tennessee Coal, Iron & Railroad Co. increasing its mining operations, adding approximately 435 additional men.—Page 73.

The Cleveland Electric Illuminating Co. announces equipment awards for its \$5,000,000 power plant.—Page 73.

Purchasing Agents' Association of Cleveland, celebrates 25th anniversary.—Page 73.

TNEC steel hearings close, will reopen in early January. New Deal advisers unable to force pledges on first quarter prices.—Page 74.

Machine tool exports to Britain tripled.—Page 74.

Large export demand for products shipped in steel barrels has greatly stimulated barrel industry.—Page 76.

New Deal unable to face pledges on first quarter prices.—Page 83.

United States now has a production capacity of 1250 planes a month and increasing factory space for still larger output.—Page 84.

Steel mills, blast furnaces and foundries consumed 3,974,000 gross tons of scrap in October.—Page 84.

Carnegie-Illinois Steel Corp. installing a large modern galvanizing unit for galvanizing sheets.—Page 84.

Andrew Fletcher, president St. Joseph Lead Co., addressed the Air Hygiene Foundation, Nov. 14 and 15.—Page 85.

Ohio steel makers are honored by Cleveland Chamber of Commerce. T. N. Girdler principal speaker.—Page 86.

New Machine Tool Builders' operating index for October 84.9 against 74.6 in September.—Page 87.

Industrial news from Canada—Page 88.

Porcelain enamel mufflers for automobiles described by L. A. Estes, of Carnegie-Illinois.—Page 90.

Accurate evaluation of jobs necessary, the Society for Advancement of Management is told by B. C. Gould.—Page 90.

E. T. Weir says Detroit is willing to pay fair prices for steel.—Page 90.

Wagner Act revision still is industry's number one problem, Tydings warns National Founders Association.—Page 90A.

French buying sends foreign machine tool orders up sharply. Gains also reported in domestic sales, with the greatest activity in the East. Long deliveries affecting local sales at Chicago.—Page 110.

Government contracts for steel in latest reported week, \$765,305

Machine Tool Exports To Britain Tripled

WASHINGTON — Machine tool exports to the United Kingdom in September this year were three times as great in value as shipments in September, 1938, the Commerce Department's Machinery Division reports, while exports of metal-working machinery to France in September, 1939, increased fourfold over the value of exports in September a year ago. In addition, this country registered gains in September exports to Japan, Canada, and British India, while shipments to the Soviet Union declined heavily and exports to Germany were completely stopped by the outbreak of war.

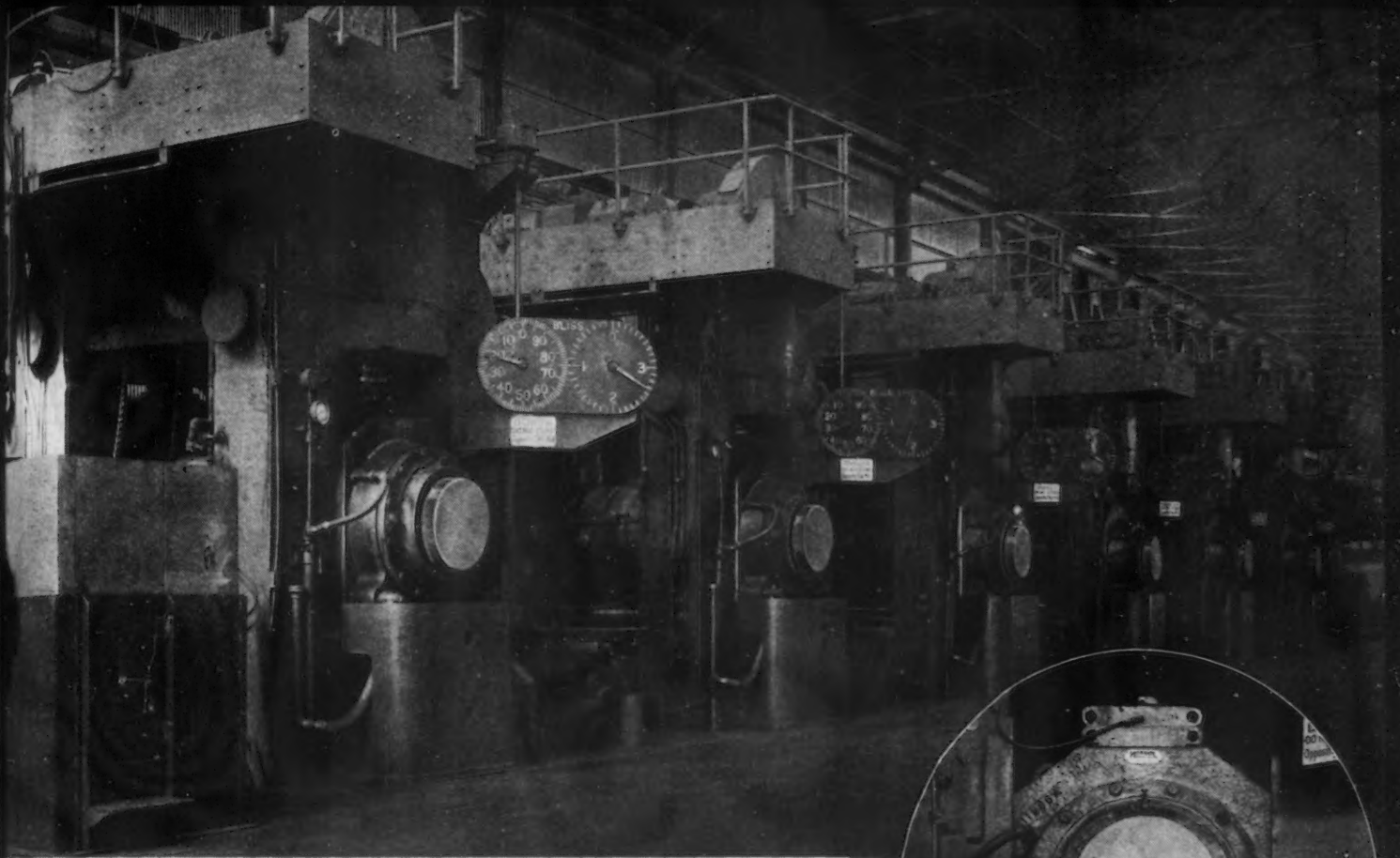
According to preliminary figures, metal-working machinery exports to the United Kingdom were valued at \$3,386,691 in September and \$2,678,276 in August. In September, 1938, the value was \$1,088,939. Figures for other countries: France, \$2,029,078 in September, \$1,980,953 in August and \$500,563 in September, 1938; Japan, \$2,047,352 in September, \$1,642,589 in August and \$2,305,799 in September, 1938; Canada, \$611,735 in September, \$587,343 in August and \$33,661 in September, 1938; British India, \$199,186 in September, \$43,688 in August and \$17,918 in September, 1938; Soviet Union, \$376,854 in September, \$1,819,213 in August and \$2,677,460 in September, 1938; Germany, none in September, \$78,523 in August and \$150,851 in September, 1938.

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MEETINGS

Dec. 4 to 8—American Society of Mechanical Engineers, Philadelphia.



Above: This 21" & 48" x 48", 4-Hi Hot Strip Mill Finishing Train is equipped with 48"-90 MORGOIL Bearings, rated 3,741,000 pounds at any mill operating speed.

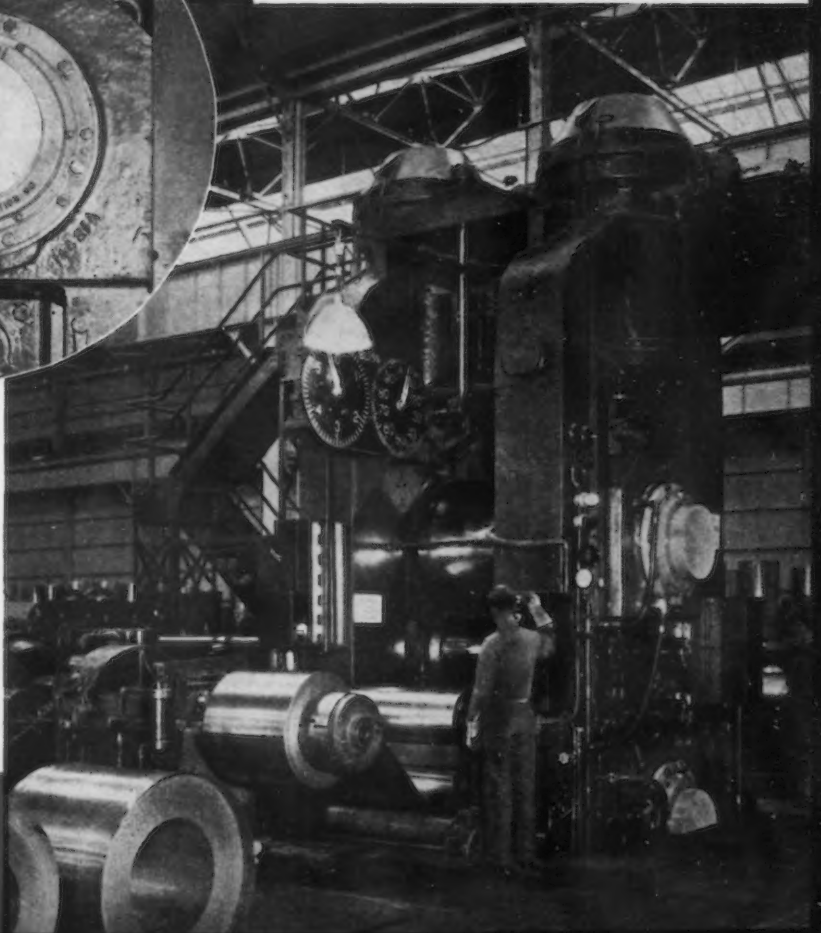
Below: This 18" & 49" x 48", 4-Hi Temper Pass Mill has 38"-72 MORGOIL Bearings, rated 1,891,500 pounds at all operating speeds.



ON Cool MORGOIL BEARINGS

Because Morgoil Bearings rotate on an *unbroken* film of oil, continuously renewed, roll necks are kept at uniform temperatures. Low coefficient of friction, high load capacity at all speeds, and freedom from wear, have led to the widest use of Morgoil Bearings in new mills of all types. Old mills—and in certain cases mills not so old—have been equipped with Morgoils to replace bearings of other types originally applied. Morgoil Bearings, by removing a *Friction Lag*, open the way to greater production of better quality at less cost. They're profitable.

MORGAN CONSTRUCTION CO., WORCESTER, MASS.



Large Export Demand For Steel Barrels

THE manufacture of steel barrels has been greatly stimulated by export demand since the outbreak of war, according to a letter received by THE IRON AGE from a barrel manufacturer, whose letter in part reads as follows:

"Since the latter part of August up to this date we have had a wonderful

pick-up in our orders as to volume. In making a very careful survey on two or three occasions since this pick-up started, we do not find that our customers are in any way building up inventories. In fact, the reverse is true—that most of our increased business has gone through the immediate purchasers' hands. Some of the increase is attributed to the fact that there are barrels being exported from the States today to suppliers' who had before purchased from European coun-

tries, who, at present, are not in a position to furnish these requirements.

"Another fact to be reckoned with is that apparently, there are not as many tankers being loaded and shipped today as there were previous to the outbreak of war, and a great many products are being shipped in steel barrels instead. It is also a fact that the steel supply for the past two or three years has been available at all times, and we were working more or less on a hand-to-mouth basis, but now we have to anticipate at least 60 days at present, and possibly 90 days when we get into the first quarter, ahead of our requirements.

We cannot see any possibility of an excessive accumulation of inventories before the middle of January or the first of February, which might be occasioned by the season's falling off in demand, for I think that most barrel manufacturers have purchased steel for the first quarter on a basis of present operation.

"However, we doubt whether or not this will continue much beyond the last of December.

"There is one element which the barrel manufacturer has to consider in this present demand, and that is that the reconditioned steel barrel has been a factor for some time in its re-use. However, over the last few years, there has been a great quantity of these barrels used for export, which, when they leave this country, very seldom return.

"For the above reasons, I see very little possibility of the barrel manufacturers accumulating excessive inventory until we are into the first quarter, and for this reason, if the war should cease by that time, we will not be in the same position we were in at the end of the World War. However, if the war continues, there is a grave possibility of a repetition of the conditions such as we had in 1919 and 1920."



An Assist! By **ATLAS**
View at Prominent Iron Foundry

To Lower Costs!

Here Atlas - designed, Atlas - built equipment moves heavy scrap and other charging materials with consummate ease.

Monorail deposits empty bucket on roller conveyor. Bucket rolls down to scale platform, is charged with iron, weight read from yard crane cab. Scale platform lowers, turns, bucket rolls down to monorail for pick-up and charge to cupola.

A propitious circle, presaging profit at the year-end—and a definitely typical Atlas installation.

THE ATLAS CAR & MFG. CO.
Engineers CLEVELAND, OHIO Manufacturers

serving the world with mobile handling equipment

Disston Co. to Expand Armor Making Facilities

PHILADELPHIA—Henry Disston & Sons, Inc., have issued bids for the erection of several additions to its plant here to accommodate the heavy government demand for light armor plate for tanks and airplanes. Total cost of the additions will be about \$250,000, with \$65,000 representing the cost of the buildings, and the balance the cost of new equipment and machinery.

TRADE NOTES

Allen-Bradley Co., Milwaukee, manufacturer of electric motor controls, has appointed as factory representatives Paul Berry, 3128 N. W. 26th Street, Oklahoma City, Okla., for Arkansas and Oklahoma, and A. V. Sorensen, of the Midwest Equipment Co., 1206 Farnam Street, Omaha, for Nebraska and western Iowa.

Sweet's Steel Co. announces the removal of its Philadelphia office from the Land Title Building to the Architects Building, 17th and Sansom Streets.

Allegheny Ludlum Steel Corp. has appointed J. M. Tull Metal & Supply Co., Inc., 285 Marietta Street, N.W., Atlanta, Ga., as tool steel representative in Georgia.

Hewitt Rubber Corp., Buffalo, announces the appointment of these distributors: Wimberly & Thomas Hardware Co., Birmingham; Machinery & Supplies Co., Kansas City, Mo.; Bitco, Inc., Wallace, Idaho; McChesney-Rand Equipment Co., Albuquerque, N. M.; P. J. Hanns Co., Eugene, Ore.; Texas Belting & Supply Co., Houston, Tex.; and C. D. Franke & Co., Inc., Charleston, S. C. These distributors will handle a complete line of industrial rubber goods.

Fox Engineering Co., 1336 Francis Street, Jackson, Mich., has been incorporated to succeed the Fox Machine Co., which has been liquidated. The Fox Engineering Co. announces that it is continuing the designing and building of machines of the type built by the Fox Machine Co.

Gar Wood Industries, Inc., Hoist and Body Division, Detroit, has announced appointment of the following hoist and body distributors: Robert P. Stapp, 209 S. 18th Street, Birmingham; Lundberg Equipment Co., 257 N. Main Street, Logan, Utah; Cate Equipment Co., 722 S. State Street, Salt Lake City, Utah; Wilson Equipment & Supply Co., 902 West 22nd Street, Cheyenne, Wyo. M. P. Arnold has been made Buffalo branch representative at Rochester, N. Y.

The Welin Davit & Boat Corp. of Newark, N. J., manufacturer of marine life saving equipment, has purchased the former plant of the National Lead Co. at Market and Herbert Streets, Perth Amboy, N. J. The industrial unit, a one-story building, contains about 40,000 sq. ft. of area and the land comprises about three acres. Following alterations and installation of machinery, this plant will be occupied by a subsidiary of the Welin Davit & Boat Corp., Alloy Fabricators Inc., fabricator of stainless and alloy metals.

Buffalo Tank Corp. announces the removal of its plant and office from Staten Island, N. Y., to Dunellen, N. J.

The William Schollhorn Co., New Haven, Conn., maker of pliers, punches, nippers, pruners and similar tools, is using a Bantam station wagon type car to demonstrate the company's products to buyers. Inside the windows on each side of the car are panels on which are arranged Bernard tools made by Schollhorn.

Armco Culvert Manufacturers Association. Middletown, Ohio, has to adopt the new name of Armco Drainage Products Association. Officers are: W. H. O'Neill, president; H. W. Force, vice-president; M. F. Shelt, secretary-treasurer. The headquarters staff at Middletown is headed up by S. R. Ives, vice-president and general manager; M. C. Patton, assistant manager; G. E. Shafer, chief engineer, and W. H. Spindler, publicity manager.

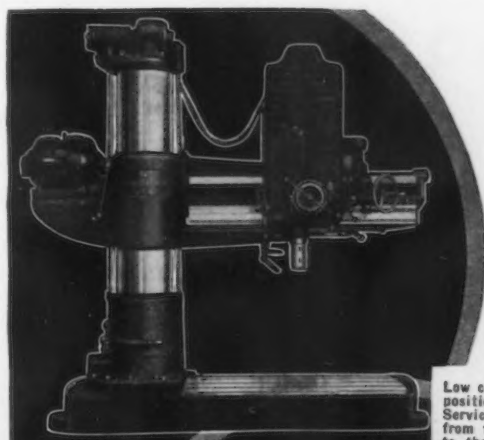
Copper

(CONTINUED FROM PAGE 41)

Another copper product with a promising future is very thin, wide sheet, produced directly by electro-deposition, at moderate cost. It can be easily bonded to canvas, felt, bur-lap, wood, paper, etc., and may be used in this fashion in many combinations.

It is obtainable in widths up to 60 in. and in very long lengths.

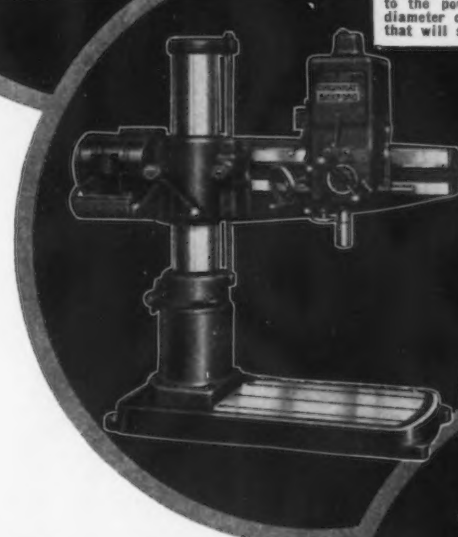
A potentially important manufacturing development is the brass die casting for which several mixtures are available with tensile strengths up to 85,000 lb. per sq. in. In this process, however, a constant consideration is the tool or die, the cost of which must be allocated over the total number of pieces which can be made during its life.



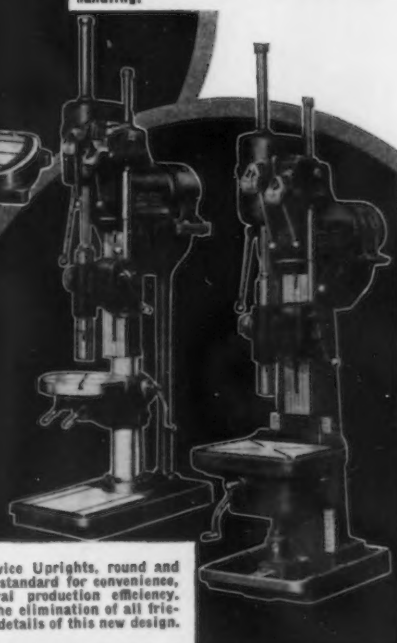
TIME SAVERS

for your
Drilling Departments

Low controls centralized 100% at the operating position are featured on the line of Super Service Radials shown at the left. All sizes, from the 3' machine with 11" diameter column to the powerful 12' arm machine having 26" diameter column, incorporate new improvements that will save money in your drill department.



High Speed 3' and 4' Super Service Radials will provide a speed range to suit your work no matter how small your drilling. All speeds and feeds changed by sliding gears with single lever control at the head. Balanced head and arm move on antifriction bearings for the ultimate in fast, easy handling.



The important machines in your shop include your radial and upright drills. New savings are possible with the recent Cincinnati Bickford developments. Features to give you "more holes per dollar" should be working for you now. Write for catalogs.

21", 24" and 28" Super-Service Uprights, round and box column types, set a new standard for convenience, stamina, accuracy and general production efficiency. One modern improvement is the elimination of all friction clutches. Be sure to get details of this new design.

The Cincinnati Bickford Tool Company
Oakley, Cincinnati, Ohio, U. S. A.

Doing Business Under Hitler

(CONTINUED FROM PAGE 33)

wire immediately to the Ministry of Labor.

But the flood of paper and the barbed wire of red tape do not end here. Prices are fixed and subject to the control of the Price Commissioner and the local price control agencies. Besides the industrial associations are supposed to control prices. Agricul-

tural prices are controlled by the Reich Farmers Association (Reich Nutrition Estate), the Minister of Agriculture and for certain specific products (potatoes, grain, sugarbeets, etc.) by special Government boards to which all such products must be offered first and which can veto any sale. An army of price control officers and Government

accountants are constantly examining the books of industrial undertakings. Special Gestapo squads raid farms looking for secret butter "stills," "boot-leg" grain, "illicit" potatoes or unstamped eggs ready to be sold to private customers, etc.

Business Hunts for Loopholes

Prices are also fixed on the basis of certain key periods of past years. Again form sheets must be filled out and new regulations which appear every day heeded. However, the control of prices is not a simple matter. Prices can be raised by lowering quality or by changing the terms of delivery so that they exclude certain rebates on bulk purchases. So for instance in the case of a certain article which if bought a thousand pieces at a time was sold at 18 per cent rebate, the rebate was reduced to 5 per cent. This was at first not considered an increase in price. The game that is being played between business and the Government is one of "cops and robbers" and every time the Government invents some new device to check the rise of prices business finds some ingenious loophole.

The Coupled Sale Trick

A FAVORITE trick is that of the coupled sale. In its most primitive form it works about as follows: A man comes to a farm to buy a cow. The official price of the cow is RM. 500. However, the farmer does not want to sell the cow. He would consider selling the cow if the man would also buy his dog for RM. 150. The stranger agrees to pay RM. 650 for cow and dog and leaves the farm. When the stranger is a quarter of a mile away the farmer whistles and Hans, the dog, returns to the old homestead.

This is a problem that every housewife and every businessman has to face daily. A head of lettuce can only be had at the local market if one agrees to buy some mildewed potatoes. The vegetable man argues the goods were forced upon him by the same procedure. Laws have been passed and infringers have been sent to jail. But the housewife or businessman that denounces such a deal to the police can be sure of an icy welcome when he next tries to do business with the colleagues of the man who was punished. The methods of making coupled sales have become less and less crude. One does not anymore say one will sell an article if an unsalable article will be bought in addition, but one arranges the goods on the counter table so that the buyer cannot help taking the hint.



**Combining
Stamping and Welding**

lowers die cost and makes it possible to gain benefit of rolled steel strength for small quantity purchases.

The channel of this inclinator frame is pressed steel 3' deep and $\frac{1}{8}$ " thick. The lugs and bosses are welded in place.

Parish engineers consider all phases of the problem; appearance, strength, improved design, and production methods leading to minimum costs.

PARISH PRESSED STEEL CO.
Reading, Pa.

PACIFIC COAST REPRESENTATIVE
F. Somers Peterson Co., 57 California St.
San Francisco, Cal.

PARISH
Specialists in
STAMPINGS
of Distinction

If the hint is not taken then the seller develops an acute attack of ear trouble and cannot understand the customer's wishes. This is of course also illegal, but on the other hand it is practically impossible to prove the case against the merchant.

Goods that are scarce are nicknamed gold-dust (gold-staub) products, because they gild the value of all those products which are hard to sell. The businessman who has a large supply of "gold dust products" can clear his stock of all unmarketable goods.

Control of Production Costs

The control of labor, raw materials and prices is, however, not the end of Government interference in Germany. Of late there has been introduced also a control of production costs. This control is limited to the execution of Government orders which, however, in most heavy industry plants constitute the majority of all orders. In the building industry alone there have been introduced 400 official time studies for the operation of masons, 256 time studies for tile-layers, 80 for plasterers and 110 for concrete workers. That the price and terms of delivery for Government orders are subject to particularly strict control and have been standardized for every type of work needs no special mention. However, the industrialist in the know will not have forgotten from the last war how to handle Army commissaries and supply departments. The story is told how an army purchasing commission came to buy wood from a saw mill. The saw mill proprietor wanted to sell them a large lot. He stated that it was wood for furniture making and that he could demand a fair price. The head of the commission told him that it was needed for bridge building by the corps of engineers but that the price made no difference if he, the saw mill owner, would see the light. The honest old saw mill owner did not see the light. The commission became insistent and one of the members seized his lapel, saying: "Why should you worry in this big war if we spend a little more for some wood?" So the bridge was built of furniture wood. This spirit of reckless spending is a characteristic of an army at war and Germany has been economically at war for the last six years. Today the army can pay with its own currency, the smallest note being RM. 10,000.

Dividends Limited to 6%

IN Germany, industry's profits are limited by law and stock companies may not pay more than 6 per cent in

dividends. Excess profits are either secretly plowed under or must be invested in government securities.

A special racket is the compulsory investment of company capital in an enterprise sponsored by the government. So, for instance, wool combing mills have been forced to invest in spun rayon plants and coal mines in coal liquefaction plants.

The subscribing to government loans and government-sponsored loans is a matter which no firm and bank can

escape. Besides, there must be taken into consideration the so-called government charities like the "Winter Help" to which "strictly voluntary" contributions are levied like a tax and are a fixed percentage of the income of the corporation. The best way to frighten a German business man is to hide behind a hedge and make a noise like a collection box.

The stock exchange and all banks are under complete control of the government, the stock exchange operation



**THE PLACE TO BUY
HEAVY FORGINGS**

Standard is a prompt source of supply for heavy forgings whether they be relatively simple like this 5,600 lb. forged ball drop or more complex like the 14,300 lb. forged crankshaft pictured here.

Standard's forgings and castings, too, are made from open hearth steel produced under close metallurgical control in our own furnaces.

STANDARD STEEL WORKS CO.
Subsidiary of
The Baldwin Locomotive Works
PHILADELPHIA, PA.
WORKS: BURNHAM, PA.

PRODUCTS
Steel Castings
Forgings
Rolled Wheels
Heavy Springs
Rolled Rings
Gear Blanks

STANDARD



FOOT VALVE LEAVES BOTH HANDS FREE

This heavy-duty rotary air control valve simplifies control of many types of air equipment. One pressure operates the cylinder, second pressure reverses the cylinder. Disc-type design without packing stops leakage and packing maintenance troubles.

Hannifin Air Control Valves are made in 3-way and 4-way types, hand and foot operated, manifold, spring return, rotary, electric and special models. Write for Valve Bulletin 34-A.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue Chicago, Illinois

ENGINEERS • DESIGNERS • MANUFACTURERS • Pneumatic and Hydraulic Production Tool Equipment

HANNIFIN *"Packless"* AIR CONTROL VALVES

"All it needs now is a spring!"

Better see DUNBAR
BROS. COMPANY
DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT

"They've been making quality springs for nearly one hundred years"

being a farce, as the government can control all quotations. Besides trading is so small that sometimes important securities like I.G. Farben have a daily turnover of 10 to 15 shares. American newspapers, however, sometimes quite seriously print quotations on such sales.

In many ways German industrialists are forced to bow to the will of the Nazi regime. One law forces all entrepreneurs to hire a certain number of apprentices whether or not they are needed. The employer, of course, can give them only perfunctory training because effective training costs money. Unscrupulous employers will use these apprentices as cheap unskilled labor.

Closed Plants "Earned" Most

An interesting phenomenon is that firms that have the greatest turnover are the ones that are worse off. Difficulties of obtaining skilled workers, inefficiency of the over-aged skilled and the clumsy unskilled workers, together with the rapid deterioration of machine equipment and dwindling exports, eat up all profits. Hence the "Gute-Hoffnungshuette" reports that, paradoxically, those of their plants earned best that, due to the raw material shortage, were closed down part of the time.

A special worry of the German businessman is the export trade, since he must inform the authorities of every transaction because the government fears he may not return the receipts of the transaction to Germany. Often he must wait months for his money as most clearing agreements provide that payment should only be made from the clearing fund when a surplus in favor of Germany exists. When deals are made with an importer in an aski-mark country, further complications are found. The importer must first find someone who needs these special marks which can be used only for special purposes within Germany. The rate of these marks fluctuates constantly and makes price calculations difficult. The war has, of course, heightened the difficulties of export trading but even before the outbreak of the war it would have been difficult for an American business man to comprehend the volume of forms and letters which must pass between a German manufacturer or exporter and the government export control office before he can get the government subsidy which is necessary to conclude most export deals. These control offices are government agencies attached to the manufacturers' associations (semi-governmental bodies).

Exchange Laws Complicated

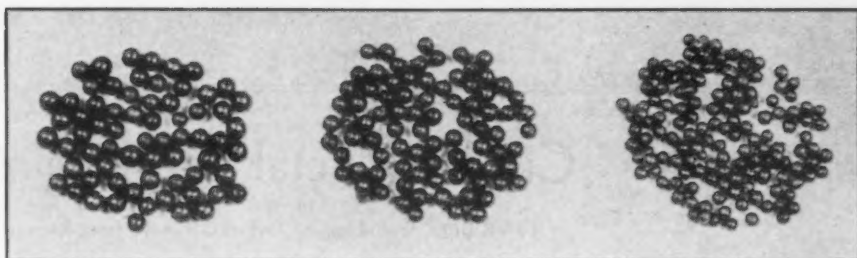
Of all the laws keeping German business men helpless, those concerning

foreign exchange are perhaps the most complicated. One such law comes out every two or three days and today there are some 1000 separate laws, decrees and executive orders filling seven thick volumes. The laws now and then contradict each other, and it is impossible for a German business man engaged in export trade or traveling abroad to get through a business year without coming into conflict with them at least once. A German business man always stands with one foot in jail, perhaps with the foot bare, and he is always dependent on the whims and fancies of the officials who may or may not like his face and his political opinions. The danger of blackmail and denunciation by spies and stool-pigeons among the employees is always a reality. Anyone who gets caught in the foreign exchange machine is lost. Fines are common and prison sentences are not necessarily disgracing.

Rearmament and lack of foreign exchange have resulted in a vast bureaucracy, thousands of regulations and bureaucratic manipulations which are an oppressive burden on private business. There are fights of competency between the different authorities. There is a general tendency to shift responsibility and firms go whenever possible to the highest authority, which may be overburdened with work, while the lower authority "loses authority." Meanwhile there is not one but a dozen totalitarian regimes in Germany, such as the Labor Front, Hitler Youth, Nutrition Estate, Foreign Office, and the Nazi party leadership itself. There have been five ministers of economy under Hitler, three commanders-in-chief of the army, three chiefs-of-staff, and two ministers of foreign affairs.

Why do German business men hold on with such tenacity under a government which is an absolute dictatorship? The urge toward holding private property, something of his own, is innate in every human being, and the collective farmer in Russia defends the little private plot of land and the few chickens which the government has left him no more zealously than the German business man defends his business. It would be the same in America. It is the same in America.

The K. & R. Iron & Metal Co., 235 W. Mound Street, Cleveland, has purchased the factory building of Ohio Metal Co., 1131-37 No. Fourth St., from Henry Loeb, who formerly operated the Ohio Metal Co. Jacob Krakowitz is president and treasurer of the K. & R. Co. and Martin A. Rosenthal, vice-president and secretary. Mr. Loeb, it is understood, is now general manager of the Central Metal Co., with temporary offices at 354 Rhoads Avenue.



IN the period of one year we have built up a very large business with our Heat-Treated Steel Shot and Heat-Treated Steel Grit. This was accomplished on purely a quality product. Our many hundreds of customers, nationally known Concerns, are using our Shot and Grit, and sav-

**We never
compromise
with quality.**

ing money every day, blasting faster with less wear of abrasive. Our heat treating insures toughness and strength, fast blasting and long wearing. Try it in your machine and prove the truthfulness of these statements. A ton or a carload. Will match any size.

HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE



"All-Purpose" ★ AIR ... ✕ COMPRESSORS

As builders of high grade pneumatic apparatus for 70 years, we offer a line of Air Compressors (and accessories), suitable for varied pneumatic requirements in mill and factory. Superior design, high grade materials, skilled workmanship, combine to produce highly efficient and reliable machines that give enduring service at low operating costs... There is one to fit your specific needs economically. Let us analyze your conditions and make recommendations. * * * * *

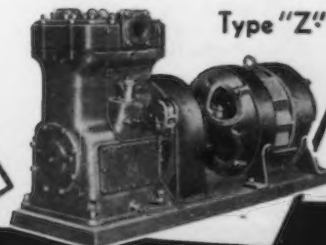
Many Types and
Sizes up to
200 cu. ft.



Type "Z"

A rugged machine, two-cylinder, single-stage, water-cooled, for continuous duty at 140 lbs. air pressure. Has many distinctive engineering and structural features. Sizes 46 to 157 cu. ft. Complete outfit with motor, either direct or belt drive. Separate compressor unit also available for coupling or belt drive... Catalogue T-2055.

Type "Z"



Westinghouse » » »
AIR BRAKE CO.

INDUSTRIAL DIVISION
PITTSBURGH, PA.

Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources

	October 1939	September 1939	August 1939	September 1938	Nine Months 1939	Nine Months 1938
Steel Ingots: (gross tons)						
Monthly output ^a	5,393,821	4,231,310	3,763,418	2,647,129	29,748,042	17,947,131
Average weekly output ^a	1,217,567	988,624	849,530	618,488	762,770	460,183
Per cent of capacity ^a	89.17	72.41	62.22	46.09	55.86	34.29
Pig Iron: (gross tons)						
Monthly output ^b	3,627,590	2,878,556	2,659,813	1,680,435	20,417,008	12,249,241
Raw Materials: (gross tons)						
Coke output ^c (net tons)		3,979,521	3,710,168	2,728,689	29,698,351	22,697,118
Lake Ore consumed ^d		4,184,884	3,775,132	2,313,865	28,074,239	16,731,692
Scrap iron consumed ^e		3,282,000	2,919,000	2,218,401	23,202,000	14,174,054
Castings: (net tons)						
Malleable, orders ^e		64,732	40,005	29,061	327,791	184,338
Steel, orders ^e		96,687	39,698	25,565	398,474	239,090
Finished Steel: (net tons)						
Trackwork shipments ^a	5,658	4,916	5,402	2,686	15,648	8,117
Fabricated shape orders ^f		118,020	94,314	92,469	988,575	785,354
Fabricated plate orders ^g		39,751	21,828	18,551	269,980	214,837
U. S. Steel Corp. shipments ^h	1,218,545	985,030	803,822	577,666	6,858,427	4,588,224
Fabricated Products:						
Automobile production ⁱ		192,672	103,343	89,623	2,570,161	1,642,520
Steel furniture shipments ^j		\$2,006,508	\$1,887,060	\$1,667,240	\$16,070,563	\$14,948,812
Steel boiler orders ^g (sq. ft.)		1,752,243	889,829	578,940	8,653,259	5,484,918
Locomotives ordered ^k	34	52	5	5	247	101
Freight cars ordered ^l	11,220	24,231	315	1,079	44,843	9,406
Machine tool index ^j	†	†	†	117.4	†	109.3†
Foundry equipment index ^k	220.4	184.4	131.4	78.7	143.3†	79.1†
Non-Ferrous Metals: (net tons, U. S. only)						
Lead shipments ^l		59,554	45,025	39,026	379,433	299,986
Lead stocks ^l	191,453	97,702	117,985	131,353		
Zinc shipments ^m	73,327	69,424	49,928	43,582	407,770	269,152
Zinc stocks ^m	72,405	95,615	122,814	130,743		
Tin deliveries ⁿ (gross tons)	6,040	5,050	6,295	4,465	46,620	38,765
Refined copper deliveries ^o	*	*	*	67,919	*	412,230
Refined copper stocks ^o	*	*	*	293,080	*	
Exports: (gross tons)						
Total iron and steel ^p		575,613	477,078	346,068	4,278,582	3,767,585
All rolled and finished steel ^p		167,674	151,134	112,915	1,234,176	1,034,440
Semi-finished steel ^p		36,319	15,587	9,947	139,888	180,734
Scrap ^p		327,724	290,346	147,203	2,741,334	2,164,857
Imports: (gross tons)						
Total iron and steel ^p		29,874	28,328	27,958	266,047	181,712
Pig iron ^p		4,176	3,204	6,922	29,423	29,184
All rolled and finished steel ^p		8,342	16,478	10,349	144,670	116,660
British Production: (gross tons)						
Pig iron ^q	*	*	*	429,800	*	5,386,000
Steel ingots ^q	*	*	*	754,700	*	8,023,300

†Three months' average. *Not available. ‡Temporarily discontinued pending revision.

Source of data: ^aAmerican Iron and Steel Institute; ^bTHE IRON AGE; ^cBureau of Mines; ^dLake Superior Iron Ore Association; ^eBureau of the Census; ^fAmerican Institute of Steel Construction; ^gUnited States Steel Corp.; ^hPreliminary figures from Ward's Automotive Reports—Final figures from Bureau of the Census, U. S. and Canada; ⁱRailway Age; ^jNational Machine Tool Builders Association; ^kFoundry Equipment Manufacturers Association; ^lAmerican Bureau of Metal Statistics; ^mAmerican Zinc Institute; ⁿNew York Commodity Exchange; ^oCopper Institute; ^pDepartment of Commerce; ^qBritish Iron and Steel Federation; ^rScrap Iron and Steel Institute.

New Deal Unable to Force Pledges on 1st Quarter Prices

WASHINGTON—Just prior and evidently timed to the TNEC steel hearings unnamed Administration "economic advisers" were quoted extensively regarding steel prices. Grave warnings went forth that if first quarter prices were advanced the country would head into an early economic collapse. The loose theory was expounded that steel is the key industry, that if it increased prices, other industries would fall in line with a resultant inflated price structure that would, under its own weight, crash in ruins.

The "economic advisers" apparently thought they had duly impressed on the steel industry responsibility they assumed if prices were increased. Some of these "advisers" who, it can be said to their credit, do not attempt to conceal their identity, thought steel prices should be reduced. But the more "moderate" thinkers were and are of the opinion that the steel industry will do its bit if it just maintains the existing price level. This, together with a vague implication of government action if prices were raised, was the point that was repeatedly emphasized.

No Pledge Obtained

It was fully blossomed when the steel hearings started. Being confronted with such a situation, it appeared to be the impression that steel executives could be placed on the witness stand and give a pledge not to increase first quarter prices. Questions designed to wangle definite commitments were directed at them. But, no matter in what form the queries were framed, whether subtle or otherwise, no promise was exacted.

Since the "economic advisers" have no personal investment at stake, they are as indifferent to steel costs as they are to the prodigious government costs which they have saddled on taxpayers. But steel executives reminded the committee of rising costs and of responsibility to stockholders in an industry whose annual average net return the past 10 years was only 2.5 per cent, according to Thomas Girdler, chairman of the Republic Steel Corp.

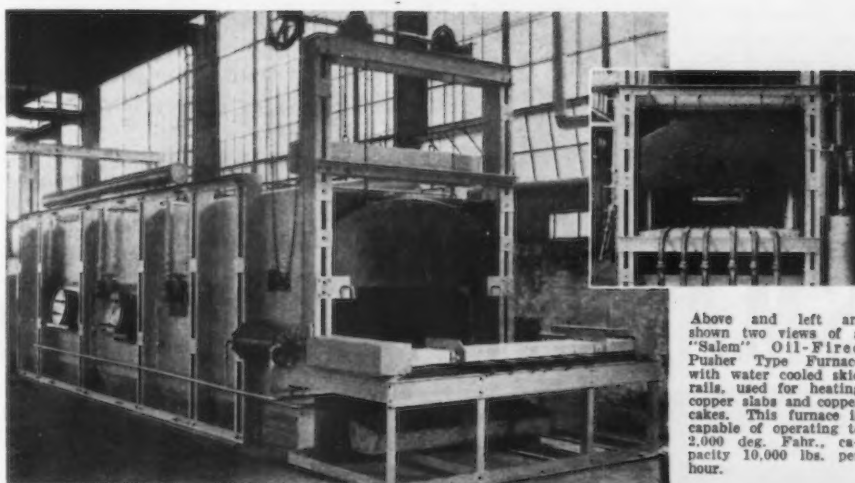
Benjamin F. Fairless, president, the United States Steel Corp. told the TNEC there are many factors which must be studied before announcing first quarter prices. President E. G. Grace of the Bethlehem Steel Co. said

that if an examination by his company discloses it is making a reasonable profit he does not want increased prices for the first quarter but that if costs are found to be rising where earnings are reaching the vanishing point, "then we ought to have a price increase." President Charles R. Hook

of the American Rolling Mill Co. was more outspoken. He flatly said there should be a first quarter price increase on sheets and strips. He mentioned flat rolled products only because they constitute the bulk of his company's output and said that therefore he did not feel that he should speak for other products.

It is a safe suggestion, however, that Mr. Hook spoke not only for himself but others in the industry when he commented on a gratuitous remark made by Assistant Attorney General

SALEM FURNACES FOR NON-FERROUS METALS



Above and left are shown two views of a "Salem" Oil-Fired Pusher Type Furnace with water cooled skid rails, used for heating copper slabs and copper cakes. This furnace is capable of operating to 2,000 deg. Fahr., capacity 10,000 lbs. per hour.

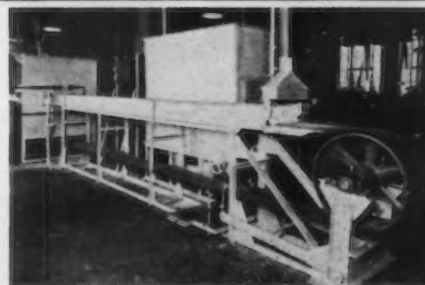
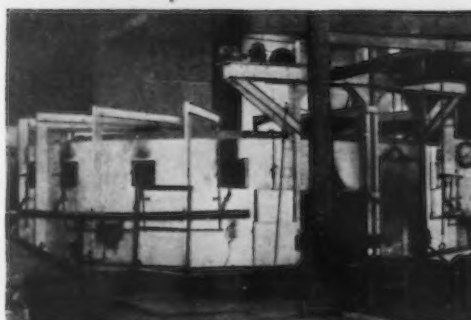
WITH much specialized training in designing and building of non-ferrous heating and heat treating furnaces "Salem" stands ready to fill your needs. Ask us about your own requirements.

Middle illustration shows a Fuel-Fired Rotary Hearth Furnace used to heat non-ferrous billets for extrusion. This furnace is also used for heating shells. Bottom illustration at the right shows a "Salem" 40 K. W. Special Atmosphere Electric Furnace with wire mesh belt conveyor for brazing firearm components. Material is delivered from furnace in bright condition.



SALEM, OHIO

New York — Chicago
Detroit — Pittsburgh
London — Paris
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SALEM ENGINEERING COMPANY

Thurman W. Arnold in his statement made at the opening of the steel hearings. After expressing the Department of Justice's gratification at the industry's decision not to increase fourth quarter prices, Mr. Arnold said he confidently trusted "that the patriotic spirit which prompted the decision will continue to rule the industry's decision in the future." Commenting on this remark, Mr. Hook said, "In sheets where there is severe competition and prices are low, I hope the industry will not be considered unpatriotic if, in view of the costs of raw materials, prices should be increased to some extent to get returns."

This attitude of steel executives was refreshing. While expressing themselves calmly, they nevertheless made it clear that they were not going to be high-pressured by the Government into a policy that would be detrimental to the interest of the industry and its thousands of stockholders. Without exception, all the steel executives who talked about prices said that all they desired were fair prices and reasonable profits, both in their own and their customers' interests. Such a policy protects rather than threatens

the economic price structure and the public interest. It was a well taken point in view of the belief that efforts were made to coerce them into a policy of not increasing prices, regardless of the justification for increases.

Mr. Girdler stated it this way in his recent Cleveland address:

"When laws are lacking to compel industry to fall into line with half-baked experiments in so-called 'economic planning' there is resort to threats, and so we have more than once seen in free America the spectacle of an attempt to govern by coercion and intimidation."

That is precisely the atmosphere that seemed to have been built around the steel industry by the New Deal "inner circle." If the industry should yield to it, it would put itself under a dictatorship. It would become straight-jacketed and ultimately destroyed at the whim of an irresponsible governmental bureaucracy, making the most of the temporary limelight it enjoys before it is returned to obscurity. If the steel or any other business is right in its policy, it ought to insist on its right, whether the "economic planners" like it or not. But if industry does not

insist upon its rights, it will deserve what they get—Stalinized government.

Mr. Girdler said it this way:

"I sometimes think that business may deserve some of the contempt the Left Wingers feel for it. All too often representatives of business are afraid to stand up and fight for their simple rights. Fortunately, there are some signs that that tendency is on the decline."

The position of steel witnesses at the TNEC hearing supports the view that the "tendency is on the decline."

U. S. Plane Capacity Now 15,000 a Year

THE airplane manufacturing industry in the United States now has a production capacity of 1250 planes a month and is increasing factory space for a larger output, according to a survey by the Aeronautical Chamber of Commerce of America.

A survey by the chamber included 43 airplane plants (of which 23 are working on military orders) and 13 engine manufacturers. Airplane factory space increased from 6,000,000 sq. ft. to 7,025,000 sq. ft. in the first six months of 1939, and aircraft engine factory space increased 324,000 sq. ft., a 20 per cent expansion, John H. Jouett, president of the chamber of commerce, said.

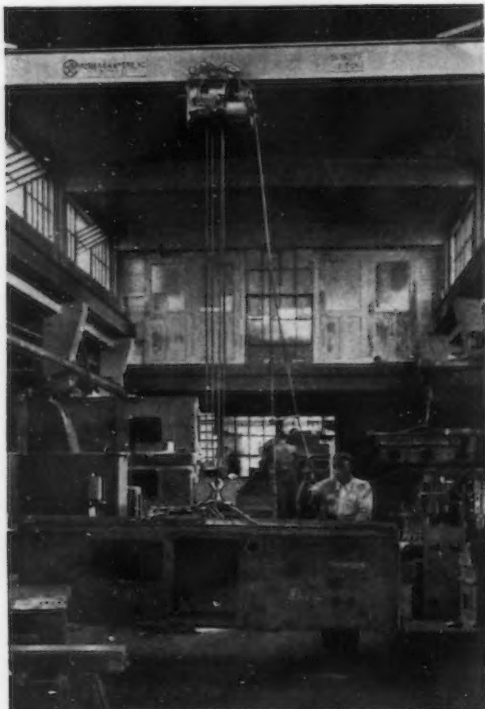
New Galvanizing Unit For C-I Vandergrift Plant

PITTSBURGH—The Vandergrift, Pa., plant of Carnegie-Illinois Steel Corp. soon will install a large modern galvanizing unit for galvanizing sheets. There are at present eight galvanizing plants at Vandergrift. This new unit will replace one of the smaller pots and will increase the plant's total galvanized sheet capacity.

October Consumption of Scrap 3,974,000 Tons

STEEL mills, blast furnaces, and foundries in October consumed 3,974,000 gross tons of iron and steel scrap in producing new iron and steel, according to the estimate of the Institute of Scrap Iron & Steel, Inc., New York. This apparently is an all-time record, and is a 68 per cent increase over the 2,393,000 tons melted down in October, 1938.

SMALL... but what a worker!



Here is an R & M Crane that might save you plenty of money. It is so smooth running that one man can easily move the crane and electric hoist at good speed, with a 2- or 3-ton load. It's the modern way to handle heavy castings or heavy anything—and keep the procession moving!

You will be surprised at how little a crane like this costs. Let R & M engineers tackle your problem. A letter outlining it will get action—and a copy of our Crane Catalog No. 7474.

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27 ft. span; 20 ft. per minute hoisting speed; 20 ft. lift.

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Air Hygiene Foundation Hears Address By Lead Executive

PITTSBURGH—Highlight of the Air Hygiene Foundation fall meeting here Nov. 14 and 15 was a frank and unusual presentation of cost figures relative to industrial hygiene presented by Andrew Fletcher, vice president, St. Joseph Lead Co., New York.

Other talks covered occupational disease legislation, labor's viewpoint on occupational disease prevention, and reports of several committees.

According to Mr. Fletcher, St. Joseph Lead Co. reduced their labor turnover from 250 per cent per year in 1918 to 3.6 per cent in 1938.

"In 1918 it was necessary to employ 250 new men each year to keep 100 on the job and in order to maintain our organization of some 2500 men, we had to hire 6250 men per year," said Mr. Fletcher.

"Based on an estimated direct cost of \$20 to \$25 to replace one man in 1919, the direct cost of 1919 labor turnover was \$125,000 to \$150,000 per year," but, he added, "it is probably safe to say that the indirect equalled the direct cost, thereby producing a total cost of \$250,000 per year. I might add that under present day conditions where machinery and brain work is necessary, instead of costing \$21 per man the figure is nearer \$100."

Turnover Reduced

By 1926 Mr. Fletcher said his company's labor turnover had been reduced from 250 per cent to 40 per cent per year and by 1933 to 4 per cent.

These phenomenal results were, in part, due to questioning employees as to the exact reason for quitting their job and as a result of this study the company took constructive steps to rectify the apparent justifiable complaints. However it was noted by Mr. Fletcher that following the installation of a system of physical entrance examinations in order to avoid placing men on jobs for which they were physically unfit, a tremendous benefit accrued to both the men and the company.

"An event which may possibly mark an important milestone in the administration of health supervision in industry, is the physical examination program inaugurated by the Industrial Commission of Wisconsin," said Dr. A. J. Lanza, assistant medical director, Metropolitan Life Insurance Co., New

York. "This is a comprehensive and far reaching plan of compulsory pre-employment physical examinations and periodic physical examinations made applicable to all the industries in the state. Pre-employment examination includes not only the ordinary physical examination but an X-ray film of the chest, a blood test for syphilis, urinalysis for sugar and albumin determinations, a hemoglobin determination, and a red and white blood cell count," he said.

Robert J. Watt, international labor representative, A. F. of L., covered labor's viewpoint on occupational disease prevention. "It would seem quite reasonable to suggest that there would be very few occupational disease problems if every possible means of prevention were investigated, and known methods put into effect through appropriate legislative standards, such standards to be supported by adequate technical and enforcement staffs and

maintained by sufficient appropriations," he said.

Financial Notes

National Supply Co., Pittsburgh, and subsidiaries, report consolidated net profit, based upon book inventories, of \$347,923 for the quarter ended Sept. 30, compared with net loss of \$331,244 in the corresponding 1938 quarter. For nine months ended Sept. 30, net loss was \$199,446, compared with net profit of \$1,176,981 for the similar period in 1938.

Universal Cyclops Steel Corp. reports net income of \$199,676 for the quarter ended Sept. 30, equal to 40c. a share, compared with \$25,477 or 5c. a share in the same 1938 quarter. For nine months ended Sept. 30 net income was \$447,412 or 89c. a share, compared with \$9,667 or 2c. a share in the corresponding 1938 period.

Vanadium Alloys Steel Co., Pittsburgh, has declared a dividend of 50c. per share, payable Dec. 2 to record Nov. 18. Dividends of 25c. each were paid in September and June.

Trade Notes

Wheelock, Lovejoy & Co., Inc., 128 Sidney Street, Cambridge, Mass., has opened a new warehouse at 4524 West Mitchell Avenue, Winton Place, Cincinnati.

John A. Roebing's Sons Co., Trenton, N. J., maker of wire and wire rope, has moved its New York City office from 10 Liberty Street to the 20th floor, 19 Rector Street.

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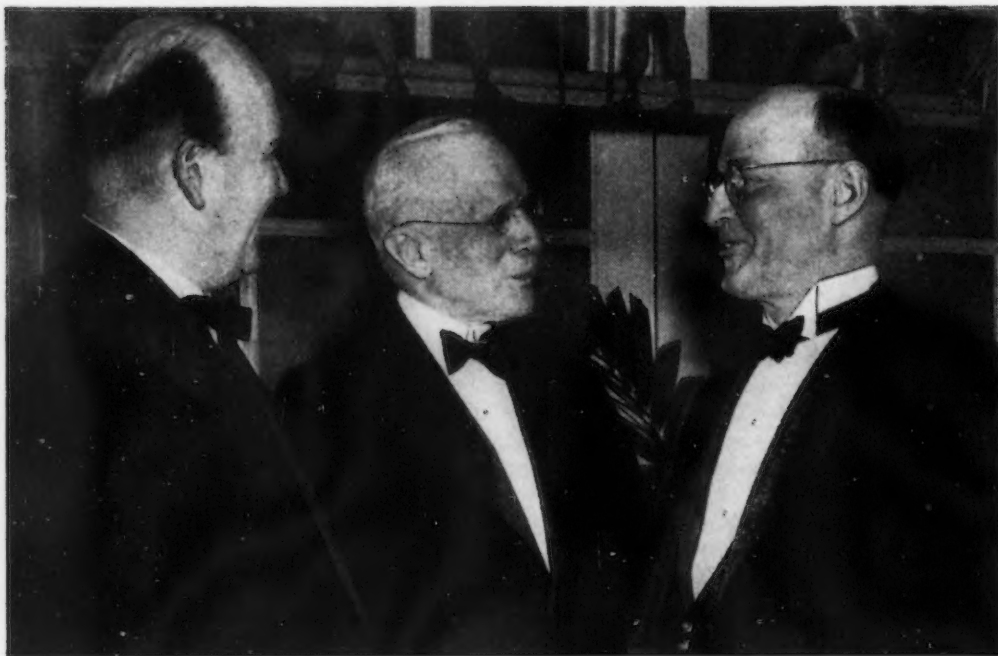
Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

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MAGNUS CLEANERS



T. M. GIRDLER, chairman of Republic Steel Corp., was the principal speaker at the Ohio steel makers' dinner given Nov. 14 by the Cleveland Chamber of Commerce. Mr. Girdler is at right in photograph; Clifford F. Hood, president of the American Steel & Wire Co., who was chairman of the reception committee, is at left, while in the center is William G. Mather, chairman of the Cleveland-Cliffs Iron Co. (Photograph by Cleveland Plain Dealer.)

Ohio Steel Makers Honored by Cleveland Chamber of Commerce

AS a tribute to Ohio steel makers for the part they have played in the industrial development of the Cleveland area, the Cleveland Chamber of Commerce gave a dinner at the Hotel Cleveland on Tuesday evening, Nov. 14, which was attended by several hundred Ohio industrialists, including many steel executives.

In sounding the keynote for the occasion, F. C. Crawford, president of the Thompson Products Co. and president of the chamber, said that "The industrial history of Cleveland shows that the manufacturing expansion of Cleveland has been founded largely upon the availability of an immediate supply of steel. A surprisingly large share of the business of this territory consists of the fabricating of steel into a great variety of finished and semi-finished products.

"What is true of the Cleveland district is to a surprisingly large extent true of the entire State of Ohio. It is by way of recognition of this fact that the Cleveland Chamber of Commerce holds a steel makers' dinner, dedicated to the significance and importance of steel to the business and industrial life of this city and of this State."

T. M. Girdler, chairman of the Republic Steel Corp., who was the principal speaker, referred to the important part that iron and steel have

played in Ohio's development from the very day of its admission as a State in 1803. In that year Ohio's first iron master, Dan Eaton, was building a crude blast furnace on the banks of Yellow Creek in Mahoning County.

Discusses Attacks on Industry

Tracing the early history of the industry in Ohio down to present-day problems, Mr. Girdler discussed with his customary frankness the attacks that have been made upon the industry.

"To say that the steel industry has never deserved criticism," he remarked, "would be to pronounce an absurdity. It has been run by men, not gods. There have been and will be again mistakes in judgment, errors in action. Yet, throughout the years many of the attacks and criticisms have been unfair and without basis of fact.

"Of all the attacks that are continually being made upon the industry, those referring to the efficiency of its plants and to its pricing policies, have been most emphasized of late.

"Criticisms respecting the industry's plants come from two directions, and are wholly inconsistent with each other. On the one hand it is said that the industry has allowed itself to become excessively obsolete, that it has failed to keep abreast of modern

improvements and mass production methods as have some other great industries. From the opposite flank the industry has been attacked with equal vigor because of its technological improvements which are alleged to have thrown tens of thousands of people off the payrolls and contributed to national unemployment.

"Now what are the facts?

"In the past 10 years, the industry has spent one and a half billion dollars in modernizing its plants. It has introduced mass production methods to the fullest extent possible in an industry which turns out its product upon the order and to the specifications of its individual customers. It has spent more than \$300,000,000 for the construction of wide continuous strip mills, to meet the requirements of the automobile industry and other users and to help give cheaper and better automobiles, refrigerators and other products to the American people.

"What has been the effect of these large expenditures and installations since 1929 on employment in the industry? In that year, which still stands as the peak of all time in the production of ingots in this country, the steel mills had 458,000 people on the payrolls. In September of this year, with production at only 72 per cent of capacity, the number on the industry's payrolls was 502,000, and at this date, the total is in excess of that. A portion of this gain is due to the shorter work week, but only a part.

"It is in respect to its commercial

practices that the industry is the recipient of the greatest flood of gratuitous advice and abuse.

"The industry is told that its prices are too rigid by people who completely ignore the utter inflexibility of the main props under costs, such as wages, taxes and freight rates.

"The industry is told that the prices of steel are too high and again by those who lightly brush aside the known fact that in recent years steel markets have been notoriously weak and for many products frequently below the high level of inflexible costs.

"The industry is accused of being monopolistic and non-competitive, in spite of the fact that for 10 years the competitive struggle for business and for existence in the industry has been unrestricted and unrelenting in all its phases, including prices.

"Whenever the demand for steel drops off, a great clamor arises for lower steel prices in compliance with the law of supply and demand.

"Let the pendulum swing in the other direction, as it has recently, and agitation starts for the industry to hold its prices down in defiance of the law of supply and demand.

"We discover then that our critics are interested not in the sanctity of the law of supply and demand, but only in keeping steel prices down regardless of costs, regardless of profits, regardless of any return to the half million people who have put their savings in the industry.

Opposed to Excessive Prices

"I am opposed to excessive steel prices at any time, and at the present moment in history it is especially important that the prices of steel and of all other commodities be held in reasonable restraint. There must be no runaway markets leading to inevitable collapse, nor any exploitation of Europe's war for profiteering purposes. No one, not even the most rabid business biter in the New Deal Administration, feels more strongly on that point than I do.

"There have been no advances in steel prices for fourth quarter delivery except by a few companies forced to mark up their quotations by the drastic increases in raw material prices which caught them unawares. As other companies replenish their stocks of raw materials, they, too, are faced with the problem of greatly increased costs. Of course, the economies from higher operating rates will help to compensate these increased costs to some extent, but not completely. To

meet the situation, many companies may find it necessary to increase the prices for their products, but no wide advances are indicated and none beyond the point justified by higher costs.

"Because I do not believe in profiteering, it does not follow that I am against fair prices which will permit the earning of a fair profit. I regard the one as destructive and dishonest, and the other as constructive, honest and in the public interest."

Mr. Girdler said that "prices which will permit net earnings of at least 10 per cent on invested capital would appear to be reasonable in the years of large demand and high activity," explaining that such profits were needed to carry the industry through lean years. Only once in the past 20 years, he said, has the industry come close to earning 10 per cent on its invested capital, and that was in 1929, when the average net return was 9.1 per cent.

Guests at Dinner

Those seated at the speakers' table at the dinner, in addition to Mr. Girdler and Mr. Crawford, the president of the chamber, were the following:

Harold H. Burton, mayor of Cleveland.
William G. Mather, chairman, Cleveland-Cliffs Iron Co.
Clifford F. Hood, president, American Steel & Wire Co.
John May, vice-president, American Steel & Wire Co.

C. M. White, vice-president, Republic Steel Corp.

Donald B. Gillies, vice-president, Republic Steel Corp.,

Crispin Oglebay, president, Oglebay, Norton & Co.

J. C. Argetsinger, vice-president, Youngstown Sheet & Tube Co.

A. F. Harvey, president, Pittsburgh Steamship Co.

R. J. Wean, president, Wean Engineering Co., Warren, Ohio.

H. E. Robinson, vice-president, Otis Steel Co.

W. C. Connelly, president, Ohio Seamless Tube Co.

J. P. Hosack, president, Mahoning Valley Steel Co.

C. A. Stillman, vice-president, Goodyear Tire & Rubber Co.

C. Clarke Wales, president, Association of Iron and Steel Engineers.

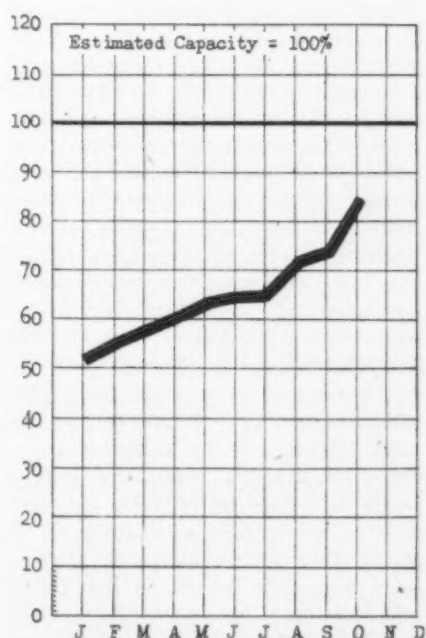
John Hill, director of public relations, American Iron and Steel Institute.

C. E. Wright, managing editor, THE IRON AGE.

E. L. Shaner, president, Penton Publishing Co.

Carl C. Gibbs, Walter I. Beam and Major General Dudley J. Hand of the Cleveland Chamber of Commerce.

Other out-of-town guests included F. H. Bryant, secretary of the Western Automatic Machine Screw Co., Elyria, Ohio; B. C. Franklin, vice-president of the same company; Raymond L. Collier, secretary of the Steel Founders Society of America, New York; Brent Wiley, editor of the *Iron and Steel Engineer*; Charles Longnecker, managing editor *Blast Furnace and Steel Plant*, and Daniel E. Morgan, director of the Jackson Iron & Steel Co., Jackson, Ohio.



Upward trend in operations of machine tool building plants in 1939 is indicated on this new chart, issued by the National Machine Tool Builders' Association. The index is based on productive payroll hours.

Machine Tool Operating Index for October 84.9

THE National Machine Tool Builders' Association reports for October an operating index of 84.9 per cent of capacity, compared to 74.6 per cent in September and 52.5 per cent for January, 1939. The index, representative of approximately 60 per cent of the industry's volume, is based on productive hours, expressed in percentage of an estimated total capacity of the companies reporting.

The October rate compares with 74.6 in September, 72.6 in August, 65.8 in July, 65.5 in June, 63.6 in May, 61.2 in April, 58.7 in March, 56.1 in February and 52.5 in January.

Reporting of the index of orders was dropped in September by the association with the explanation that recent conditions in the industry had emphasized the difficulty of determining what may be regarded as firm orders for the purpose of the industry's index of new business.

INDUSTRIAL NEWS FROM CANADA

Industry Awaits War Contracts

TORONTO—While War Purchasing Boards at Ottawa have not yet made known the awarding of contracts under the new war purchasing plans for guns, munitions, shells, airplanes, ships, etc., representatives of the various Canadian primary steel companies have been spending considerable time in Ottawa during the past couple of weeks working on plans and schedules for providing the necessary steel and raw materials.

In official circles it is learned that negotiations in connection with British and Canadian war contracts have been moving along better during the past week or ten days. There have been numerous obstacles and difficulties to be ironed out which are given as reasons for delay. Another factor has been the nature of hostilities on the battlefield, with little destruction of production facilities or equipment and comparatively small expenditure of war munitions. At the same time Britain, under the speed-up production schedules, has been able to produce supplies in excess of immediate requirements, making deliveries from Canada less urgent.

Reports in Ottawa also point to the possibility that government officials are reaching the stage where at least a partial picture of the vast organization in Canada for the Empire's war effort may be given to the public. Behind closed doors in government buildings and rented offices technicians and experts have been working night and day on plans which will bring unprecedented industrial and training activities in the Dominion. Within two weeks and probably earlier, simultaneous announcement will be made in Ottawa and London on the huge Empire air training scheme. Possibly sooner a glimpse will be given of the amount and allocation of the purchasing and construction programs being handled by the War Supply Board for both the United Kingdom and Canada. It is understood that Finance Minister Ralston, next Friday, will reveal to some extent the manner in which the \$100,000,000 voted for war at the September emergency war session of Parliament is being spent. The finance minister also is expected to give information regarding additional

expenditure Canada will be called upon to make on war account.

* * *

TORONTO—While no change was reported in iron and steel scrap prices for the week, local dealers state that some weakness is developing in cast scrap, but has not been carried to lists. Other materials are steady. Recent advances have stimulated offerings and new supplies are appearing in large volume. One local dealer stated that his company's baling machine is not able to keep pace with intake of scrap. Steel Co. of Canada, Hamilton and Dominion Foundries, Toronto, are taking large quantities of scrap, while other consumers also are interested. Dealers, however, state that the general market situation is uncertain and, as a consequence, are taking orders only from week to week. No long term booking is being done.

Steel Sales Taper But Shipments Hold

TORONTO—While there has been minor tapering off in sales of iron and steel materials during the past week or ten days, local interests state that this has in no way affected production or shipments. Forward delivery contracts booked a couple of months ago are taking care of the greater part of mill production and officials of steel concerns state that they are assured of capacity operations for some months to come. While only a limited amount of business has been booked against war needs, Canadian mills have representatives in Ottawa working on plans for supplying necessary steel for guns, airplanes, shells, munitions, etc. Proposed ship building program for Canadian yards will furnish further big demand for steel.

Current steel sales are in small lots, with no heavy orders reported for the week. Prices still are based on delivery dates and it is stated that higher levels will become effective on first quarter business in some lines. It is stated that minor advances already have gone into effect on hot rolled and galvanized sheets, but the change has not been carried into official list for publication. Sheet demand continues steady, with mills covered to the year-end, while bars are showing steady demand. Small steel lines also

are moving in good volume and delivery dates are being pushed nearer to the end of the year. Local steel interests state that inquiries are beginning to appear for first quarter, which indicate that booking for the first three months of 1940 will be heavy for peace-time production needs.

Merchant pig iron sales are attracting little attention. Sales are steady in lots of 50 to 200 tons, totaling about 1500 tons weekly. The daily melt is being stepped up, with indications of a sharp jump toward the end of the year. Large melters are taking delivery against contract piling supplies against future needs. It is stated that there may be a reduction in production of iron soon, due to necessary relining of furnaces.

It is understood that Steel Co. of Canada, Hamilton, Ont., may blow out its small furnace for relining at the beginning of the year. In this event the Steel company will have little or no iron available for merchant markets but will need its entire output for further steel production in its own works. It is stated that the Hamilton plant will soon receive large contracts for steel on war account. Pig iron prices continue firm at levels unchanged for the week.

Demand for structural steel and reinforcing bars is more active and some good contracts have been closed during the past week or two, while other contracts are pending, estimated to total in excess of 10,000 tons. Sarnia Bridge Co., Sarnia, has contract for 750 tons of steel for collegiate institute at Chatham, Ont. Dominion Bridge Co., Lachine, Que., has contract to supply 3000 tons of steel for \$3,000,000 hospital at Quebec for St. Michel Archange. Provincial Department of Roads, Quebec, Que., will build bridge over Quebec-Montreal highway, for which 750 tons reinforcing bars will be required. Canadian Car & Foundry Co., Montreal, has contract for 500 tons reinforcing bars for bridge at Lagauchetiere Street for Canadian National Railways.

Officials of Hayes Steel Products, Ltd., Merriton, Ont., state the plant is operating at capacity in all departments. An addition is under construction to the plant which will provide additional 10,000 feet floor space and cost \$50,000, exclusive of equipment.

The War Supply Board has called

for tenders for construction of a test range for Bren Guns at Toronto. John Inglis Co. is producing these guns and it is stated that manufacture has reached the stage where they are ready for test and deliveries will start soon. The initial educational contract was for 7000 guns for the Canadian Government and 5000 for the British War Office.

1500 Training Plane Order Goes to U. S.

OTTAWA—An initial order for 1500 advanced training planes has been placed with a United States manufacturing firm, according to announcement made in reliable quarters. This is said to be the first of a series of orders that may total up to 5000 planes for the Canadian and British governments.

Announcement also will be made during the next week or two regarding other large contracts for planes and other equipment necessary to the big air plant for Canada. It is stated that contracts totalling in excess of \$100,000,000 will be awarded soon. It is further stated that representatives of Canada, Britain, Australia and New Zealand have almost completed organization details as well as arrangements for financing the gigantic training project and a general description of the plan is expected to be announced next week in London and the capitals of the various Dominions.

Bulk of the aircraft, both primary trainers and the advanced type of machines, will be built in the United States and Canada. Britain needs at home all the training planes it can turn out in its own plants. Some Canadian plants are turning out primary trainers now, but in relatively small number. It is stated that the North American Harvard, a two-place low-wing monoplane with retractable landing gear will be the standard advance trainer for fighting pilots. Other slower types of planes also will be used for training purposes.

W. F. Schayler, representative of a British aircraft company at Portsmouth, England, in an interview at Montreal, stated that every large city in Canada will have at least one and possibly two air training stations in connection with the scheme for training British Empire pilots in this country. "The training camps will have to be kept in the urban areas and not in the country," Mr. Schayler stated. "Canada's plants are well up to the standard accepted in Britain." Mr.

Schayler has just completed an inspection tour of Canada's aircraft plants.

War Purchasing Board announced that 12 new hangars will be built at Royal Canadian Air Force air stations in Nova Scotia, and tenders for construction have been called. At Dartmouth two seaplane hangars and three single landplane hangars will be erected. Two single landplane hangars and two seaplane hangars will be built at Sydney and three single landplane hangars at Yarmouth. Tenders also are called for three seaplane hangars and two single landing hangars to be built on the Pacific coast.

In taking delivery of airplanes from the United States, tractors will be used to haul the machines across the international border, Defense Department officials announced. It is planned to fly the machines purchased for Canada and Great Britain to a point in the United States near the border where they will be taken in tow by tractors and moved across the border to airports on the Canadian side of the line, when Canadian pilots will take over and fly the machines to their destination, either in Canada or England.

Officials indicated that this method would be followed in confirming reports from Washington that international law would prevent such planes being flown across the border under their own power.

Canadian Plant Expansion

WAR Purchasing Board, Ottawa, has awarded contract to A. I. Garvock, Regent Theatre Block, Ottawa, for construction of landplane hangar at Trenton, Ont., to cost \$183,000 for Royal Canadian Air Force.

John Bertram & Sons Co., machinery manufacturer, 15 Platt Ave., Dundas, Ont., will erect two buildings of one story, additions to plant. Hutton & Souter, 36 James St., S. Hamilton, Ont., are the architects.

Dr. Leonard Stein, c/o F. E. Hare, City Clerk, Oshawa, Ont., plans erection of factory on 13-acre site, for manufacture of fancy glassware.

Toronto Iron Works, Ltd., 629 Eastern Ave., Toronto, Ont., is having plans prepared for erection of one-story, 60 by 156 ft., machine shop. H. G. Duerr, 910 Lumsden Bldg., Toronto, is architect.

Chrysler Motor Corp. of Canada, Ltd., Tecumseh Road East, Windsor, Ont., is considering plans for addition to plants. The additions will include

one-story plant extension, one-story extension to office building and one-story drive-away-building, to be of structural steel and brick construction.

Great Lakes Lumber Co., Ltd., plans construction of saw mill and planing mills at Fort William, Ont., to cost \$100,000. A by-law will be submitted to ratepayers and upon its approval construction work will be started within 30 days.

Ed. Donnelly, Golden Valley, Ont., is having plans prepared for sawmill at Port Loring, Ont. Owner to purchase machinery and other equipment and supplies.

Steel Co. of Canada, Ltd., Hamilton, Ont., has awarded a structural steel contract to Hamilton Bridge Co., Bay Street North, for plant addition one story, 100 by 130 feet.

L. A. Young Industries of Canada, Ltd., 187 Geary Ave., Toronto, has awarded a general contract to R. J. Hibbs Construction Co., 15 Trent St., Toronto, for erection of one-story, 200 by 320 ft., factory on Eglinton Ave., Leaside, Ont.

Burgess Battery Co., 391 Buttery St., Niagara Falls, Ont., has awarded a structural steel contract to Standard Steel Construction Co., Port Colborne, Ont., and general contract to Zimmerman Construction Co., 1023 Stamford St., Niagara Falls, for erection of factory addition.

Canadian Hanson & Van Winckle Co., Ltd., 2 Silver St., Toronto, machinery manufacturers, has awarded contracts in connection with \$30,000 plant addition on Morrow Ave. J. G. Kent & Son, Ltd., 1221 Bay St., have general contract.

Canadian Barrels & Kegs, Ltd., Shantz St., Waterloo, Ont., has awarded contract to Ball Bros., 35 King St., E., Kitchener, Ont., for factory addition.

International Harvester Co. of Canada, Ltd., will construct \$185,000 motor truck service and sales building at Bathurst and Wellington Sts., Toronto. H. E. Miller is the Toronto manager.

A. E. Whitehouse, 976 St. George St., Montreal, has awarded a contract to Delorimer Construction Co., 4519 Christophe Colomb St., for erection of a \$20,000 machine shop.

Duranceau & Duranceau, 5847 Hamilton St., Montreal, have general contract for erection of shop additions for Canadian National Railways, at Pointe St. Charles coach yards.

Peter Bain Lumber Co., Johnson St., New Westminster, B. C., will erect a \$50,000 sawmill.

Porcelain Enamel Mufflers for Automobiles Described by Estes

THE use of porcelain enamel to lengthen the life of automobile mufflers and shop equipment were among the new applications for enameled products disclosed by L. A. Estes, manager, commercial division, Carnegie-Illinois Steel Corp., in an address presented at the ninth annual meeting of the Porcelain Enamel Institute last week in New York. Mr. Estes said that enameled mufflers were being tried out by several automobile makers and the results so far were encouraging. The enamel coating service to protect the parent metal from the deteriorating effects of the products of combustion which must pass through the exhaust and at the same time can withstand temperatures up to 1700 deg. F. Many new uses for enameled products are being found by the shipbuilding industry, Mr. Estes said, due to the ability of these products to resist the effects of salt air and high humidity.

Another speaker at the meeting, B. L. Wood, consulting engineer, American Iron and Steel Institute, told the enamellers that the growing use of enameled products, steel for architec-

tural purposes required that they inform the drafters of new or revised building codes of the true capabilities of this product to insure its acceptance. Mr. Wood expressed the opinion that one of the major problems before the industry at the moment was the standardization of panel sizes, etc., to widen its use by builders.

It was also disclosed at the meeting that one of the prime aims of the Formed Metal Plumbing Ware Association, an affiliate of the institute, had been achieved. This aim was to have the Federal government to include specifications for enameled ware in Government bids.

The new officers of the association elected at the meeting are: President, P. B. McBride, Porcelain Metals Corp., Louisville; vice-presidents, William H. Britt, Enamel Products Co., Cleveland, and R. R. Danielson, Metal & Thermit Corp., New York. William Hogenson, Chicago Vitreous Enamel Product Co., Cicero, Ill., was reelected treasurer, and C. S. Pearce, Chicago, was again chosen as managing director.

Accurate Evaluation Of Jobs Necessary

DETROIT—Because there is “a definite need for a method other than the law of supply and demand to set wage standards” it is becoming more necessary to establish proper differentials in order to maintain good labor relations, according to B. C. Gould, engineering consultant, who addressed the Detroit chapter of the Society for Advancement of Management at its November meeting. Mr. Gould, of Stevenson, Jordan & Harrison, Chicago, declared also that new restrictions on management make it necessary to adopt new techniques in this phase of management.

He linked wage incentive plans and job evaluation historically, and declared that from the early '20s the increasing use of wage incentive plans had raised a demand for accurate job evaluation.

Discussing briefly the two general classes of job evaluation, the grading method and the rating method, he declared that the first was more difficult

to substantiate in the eyes of employees, required an expert analyst for the evaluation, and was based on human judgment—with the additional defect that spreads in rates were hard to establish definitely under the grading method. The rating method which he advocated makes use of the highest and lowest rates as initial points for the establishment of a scale. Use of this method is hinged on a plan originated about 1925 under which all jobs are assumed to require the same qualifications, but, different degrees of these qualifications.

Fundamental elements considered in rating jobs are general schooling, training period, manual skill, versatility, job knowledge, responsibility, and working conditions. In the job analysis, each occupation is accorded a number of points under each of these headings and the resulting numerical figure is used in conjunction with a conversion chart which, in effect, relates all jobs to the baseline set by the current rate paid for unskilled labor.

A refinement of the method makes use of a logarithmic conversion chart

making comparisons simple even though plants may be in many sections of the country and with many basic rates involved.

Mr. Gould described the procedure, including the selection of personnel to do the analysis, and urged that in many cases employees could be of great assistance in making the analysis, by working in conjunction with the analyst in defining occupations. The speaker declared that, if different groups using this method used corresponding care and judgment in defining occupations and reached similar definitions, the outcome of their evaluations would be comparable and mathematically similar.

Mr. Gould distributed to the audience “A Manual for Occupation Evaluation,” a booklet which explains the rating method and includes a copy of a conversion chart and analysis record, plus sample summary charts for use in job evaluation.

Weir Says Detroit is Willing to Pay Fair Prices for Steel

THE automobile industry is always willing to pay reasonable prices for steel, E. T. Weir, National Steel Corp. chairman, recently told the TNEC. It does not, he said, put undue pressure on the industry but does know the weaknesses of the market.

Mr. Weir made the observation after Leon Henderson referred to the NRA study he had made of the automobile industry. Mr. Henderson, representing the SEC, said that the steel industry on the one hand complained of the close bargaining of the automobile industry while the automobile industry on the other hand complained of unreasonable steel prices.

Mr. Weir declared that the low price of sheets is not due to the undue pressure of automobile manufacturers but that the fault lies in the merchandising practice. He expressed the view that the steel industry's merchandising policy is not only bad as to sheets but also as to other products because it sells below cost.

Mr. Weir said there is no excess capacity in steel today after Mr. Henderson had stated there is a tremendous excess in rail, plate, shape and wire rod capacity.

“I'm in favor of competition in the industry,” Mr. Weir said, “but not of competition where it sells below the average cost.”

Wagner Act Revision Still Industry's No. 1 Problem, Tydings Warns N.F.A.

REVISION of the Wagner Act to make it a "two-way street and not a blind alley" was listed by Senator Millard E. Tydings of Maryland, in an address before the members of the National Founders Association last week, as one of the most important tasks confronting industry today. He warned that although the current improvement in business might temporarily take attention from the workings of the labor act, revision of the act must come if a lasting prosperity is to be established.

Senator Tydings emphasized that the rights of labor to organize must be adequately protected, but that the equally important rights of the public and capital should also be given consideration not conceded in the act.

The senator condemned sit-down strikes as being "pure anarchy," and asserted that the return of prosperity had been delayed by the condoning of these sit-down strikes by authorities "in high places."

Debt for Five Generations

Another important task confronting industry, the senator told the founders, was the educating of the average person to a realization that in the final analysis the burden of repaying the large governmental expenditures of the past 10 years would fall in a large measure upon the small taxpayer. He

pointed out that it would take five generations of Americans, paying at the rate of \$500,000,000 annually, to amortize the present national debt. Interest and amortization of the debt costs take 25 per cent of the nation's

annual income, the legislator pointed out. If the average person could be made to appreciate his stake in this matter, Tydings felt, it would militate against further "promiscuous" additions to the national debt.

Senator Tydings' address was a feature of the 43rd annual convention of the National Founders Association, held last week at the Waldorf-Astoria Hotel, New York. About 170 members of the association attended the meeting.

Hamerstadt Elected President

William D. Hamerstadt, Rockwood Mfg. Co., Indianapolis, was elected president of the association at the business meeting Thursday, and Donald C. Bakewell, Blaw-Knox Co., Pittsburgh, was elected vice-president. J. M. Taylor was chosen again to serve as secretary-treasurer and A. E. McClintock was reappointed commissioner. New members elected to the various district committees were as follows: First district, Franklin Farrel, III, Farrel-Birmingham Co., Ansonia, Conn.; second district, C. P. Clark, Clark Brothers Co., Olean, N. Y.; third district, S. P. Hazard, R. D. Wood Co., Philadelphia; fourth district, George Cannon, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., R. W. Gillispie, Jeffery Mfg. Co., Columbus, Ohio, and I. R. Wagner, Electric Steel Castings Co., Indianapolis; fifth district, E. S. Pillsbury, Century Electric Co., St. Louis; sixth district, Fred S. Power, St. Paul Foundry Co., St. Paul; seventh district, John D. Capron, Glamorgan Pipe & Foundry Co.,



OFFICERS of the National Founders Association for 1939-40, chosen at the annual convention in New York last week, are: president, W. D. Hamerstadt, Rockwood Mfg. Co. (top); vice-president, D. C. Bakewell, Blaw-Knox Co. (above); secretary-treasurer, J. M. Taylor, Chicago (left), and commissioner, A. E. McClintock, Chicago (right).



Lynchburg, Va., and W. C. Trout, Lufkin Foundry & Machine Co., Lufkin, Texas.

Warns of Over-Expansion

A warning against over-expansion of plants and equipment in anticipation of war orders was voiced by Franklin R. Hoadley, Atwood Machine Co., Stonington Conn., retiring president of the association.

"In the enthusiasm of the moment it may be a temptation to take on war business," Mr. Hoadley said, "to an extent that will interfere with deliveries to regular customers, and this will alienate friends. One sad lesson of the World War should teach caution. Millions of dollars were sunk in bricks and mortar, where in many cases temporary construction would have served the purpose. Expansion which will provide facilities for war work, which by its very nature is only temporary, should be financed with our eyes wide open. Expansion of plant or equipment should adapt itself to our regular lines of manufacture after the war is over, or it should be amortized over a very short period. Many companies which boasted handsome surpluses before the World War went bankrupt from over-ambitious growth during those years."

War and Closed Shop

American industry has avowed its opposition to war, the retiring president pointed out, and has more to gain from a lasting peace than from a temporary stimulation, brought about by war. He warned, however, that in the eventuality of war, it is possible that the "ruthless type of labor leadership" that ordered the coal strike in 1917-18 is "looking forward to a war boom to produce the opportunity for it to extend the closed shop, and all that implies, to steel, automobiles, and the packing houses. If a war boom made it possible for them to close up these three important industries, and the Government failed to restrain them, we might see the beginnings of a most serious price inflation period. It would not only cripple industry's ability to produce but might, if carried far enough, injure the credit of the United States Government."

Supporting President Hoadley's position on the industry's desire for peace, was a resolution adopted at the closing session of the convention calling for the preservation of American neutrality and urging all the association to resist efforts to draw members of the association to resist efforts to draw the United States into the European war.

A. E. McClintock, commissioner of the association, who addressed the convention at the opening session, thought that the Wagner Act, as interpreted, removed all confidence that had previously existed between employee and employer and violated all principles of fair play. Under the rulings of the NLRB, he asserted, management is able to speak directly to its labor only at its peril, and the enforcement of the act compels management to ignore a minority which can well total 49 per cent of all their workers. He charged the listening foundrymen not to lose sight of the fact that the labor violence of recent years was the work of only a very small portion of American labor and that the vast majority of American workers were not in sympathy with that type of labor expression.

Idle Money Blamed

Idle money lying unused in banks instead of being applied to the purchase of consumption goods or capital equipment, was credited by Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., with being an important reason for the failure of business to recover over the past six years, in face of the large sums spent by the Government. From such statistics as are available, Mr. Flanders estimated that business as a whole owns only 18½ per cent of all deposits, the balance being held by private individuals. If these funds, estimated at 50 billions in 1936, had been released and put into use purchasing goods, he felt that business would have recovered without the impetus of either a war or high governmental expenditures. Investment and spending cannot be stirred up by taxing business profit and income, he said, but if governmental policies favorable to business enterprise and if business were keen to occupy the new frontiers of an enlarged standard of living for the mass of the American people, then a large portion of these hoarded sums could be put back into circulation.

Small Airplane's Future

The prediction that the production of small airplanes may soon rival the production of automobiles was made at the Wednesday luncheon meeting by William B. Stout, president, Stout Engineering Laboratories, Dearborn, Mich. These planes, he said, would be made to sell at a price lower than even the cheapest car, would be extremely fool proof and could be operated by anyone. A revival of student and individually owned airplanes and travel has boosted sales of airplanes to close

to 3000 in the past year, he said, and predicted that 6000 small planes would be sold in 1939 and 12,000 to 15,000 in the following year.

Mr. Stout minimized the importance of the war in spurring plane production, asserting that the great background of the aircraft industry is regular, every-day commercial production.

Another interesting address was that delivered by Gregory J. Comstock, metallurgical consultant, New York, on "Metal Powder Metallurgy." Mr. Comstock reviewed the history of metal powder manipulation and sketched the process employed in the production of platinum, tungsten, molybdenum, tantalum, contact materials, porous metal bearings and the hard cemented carbides. He predicted a wide use of this method on production parts and displayed a number of molded powder oil pump gears, which had satisfactorily taken the place of a cast iron gear. Metal powder parts can be maintained to tolerances sufficiently close to eliminate all machining operations and can be reproduced in large numbers with constant dimensions. The chief present source of the raw material, sponge iron, is Sweden and the present cost of around 7c. per lb. was not prohibitive, he said. He also described efforts that were being made to develop domestic sources of this material and attributed the slowness of the expansion of the domestic output to the fact that to become an economic actuality it was necessary to create a backlog of other sponge iron uses, which was slowly being done. A number of high grade sources of the magnetite ore used for making sponge iron are available in the United States, Mr. Comstock said.

Others who addressed the convention were John C. Gall, counsel for the National Association of Manufacturers, Col. F. H. Miles, Jr., Commandant of the Army Industrial College, Brig. Gen. Henry J. Reilly, O.R.C., and Eugene J. Bengel, management engineer, Chicago.

Trade Notes

Mercantile Metals, Inc., Robert M. Moore, president, Grant Building, Pittsburgh, has been appointed sales agent in the Pittsburgh-Ohio territory for Sloss ferromanganese, the Sloss-Sheffield Steel & Iron Co., Birmingham, announces.

A. J. Fritschy Corp. has moved its office to 56 Box Street, Brooklyn, N. Y.

The Holland Precision Parts Co., a \$500,000 corporation, is being formed for the manufacture of automobile and aircraft parts at Holland, Mich. A new factory building is planned with production scheduled to start in about three months.

MANUAL ON CUTTING OF METALS

—A Critical Review

AFTER seven years of painstaking work and much original research and investigation, the A.S.M.E. Committee on Metal Cutting Data has published a Manual on Cutting of Metals with Single Point Lathe Tools. This committee was appointed in August, 1932, by the A.S.M.E. Special Research Committee on Cutting of Metals (itself formed in 1923), to correlate the work that has been done by the many investigators since Frederick W. Taylor's epoch making paper On the Art of Cutting Metals was presented before the American Society of Mechanical Engineers in 1906; also to fill in the gaps in the various investigations and to reduce the data to a form that would permit of practical application in the machine shop.

L. P. Alford, consulting engineer and chairman of the department of industrial engineering, New York University, is chairman of the A.S.M.E. Committee on Metal Cutting Data, and Robert C. Deale, consulting engineer, is executive secretary. Mr. Deale was in charge of the experimental work, the derivation of equations and the compilation of data. Twelve other members of the society also served on the committee.

All available data, both published and private company records, were reviewed. Experiments were made by the committee on the cutting of steel and cast iron in an effort to close the gaps in the recorded data, and from the combined information, important facts or laws connected with the art of cutting metals were determined. Tables were developed from the derived data by which speeds and feeds for various depths of cut can be determined for seven generally used tool forms and for the various materials commonly encountered in the machine shop.

Scope of Book

The three parts of this 318-page volume comprise (1) factors influencing the cutting of metals; (2) a series of tables of cutting speeds and horsepower for various cuts on different ferrous materials; and (3) the equations and constants required for calculating cutting speed, economic tool life, chip pressure and horsepower, together with instructions as to their use. The second part is limited to

information on the cutting speeds possible with seven shapes of single nose, 18-4-1 high-speed steel tools, cutting a wide variety of commonly used S.A.E. steels and cast irons. Tables are also included for cutting one grade of cast iron and one of steel with the same seven shapes of tools, made respectively of carbon steel, Stellite J metal, and cemented tungsten and tantalum carbide.

This manual is an outstanding addition to literature on the cutting of metals, perhaps the most significant contribution since the publication of Taylor's work. As such it is a necessary adjunct to any machine shop library. The manual is being sold through the American Society of Mechanical Engineers, 29 West 39th Street, New York, at \$5 per copy.

It is apparent that a tremendous amount of effort has been put into this work. Without a doubt for the first time in this country, there has been packed into one volume practically all the known information relating to lathe operations, with but one important exception—that relating to the influence of cutting compounds or coolants. Although all but the last report of the Subcommittee on Cutting Fluids of the A.S.M.E. are listed in the bibliography, it is apparent to one familiar with this 10-year research program that many of the conclusions and the methods of approach of this subcommittee have not been taken into account. In the 1½-page chapter devoted to a discussion of the influence of cutting fluids, this work is largely dismissed with the statement: "Research has not been carried to the point where definite statements can be made as to the correct cutting fluid to be used for best results for any given set of conditions." Some brief conclusions are then named, and a general allowance for the use of coolants is given by means of two formulas.

Some Shortcomings

In fact, it is in connection with this chapter that one of the manual's chief shortcomings stands out, what seems to this reviewer illogical arrangement of material and lack of adequate cross references. Hastily paging through the book, as one does to get a general impression of the context, the first thing that strikes the eye is that all

cutting speeds for a given feed and depth of cut are based on a tool life of 60 min., cutting dry. How to convert to some other basis of tool life and to allow for the influence of a coolant? On page 42, in the chapter on cutting fluids, it is suggested that 15 per cent be added to these speeds when adequate coolant is supplied up to a feed of 0.015 in. per rev. and thereafter the coolant factor equals $2.2T^{0.15}$. No hint is given here that on pages 77 and 78, three tables of "multipliers" are printed for obtaining cutting speeds and horsepowers for cuts with four different tool forms when using 5 gal. of "cutting fluid" per min., rough cutting steel. These factors add 16 per cent to the allowable cutting speed at the low feeds and up to as much as 60 to 68 per cent at the heavier feeds. The tables save laborious calculation of an exponential equation. Nor is it plainly stated where one should look to obtain factors for converting cutting speeds to some other basis than a 60-min. tool life.

On page 52 in the general discussion on economic tool life, the committee presents recommendations as to reasonable tool life for various machines; such as 40 min. tool life actually under cut for ordinary operations on an engine lathe as against 400 min. on an automatic screw machine. In this same chapter general factors for the conversion of cutting speed on any other basis than 60-min. tool life are given for various types of tool material. More complete factors are given in the front of each tabular section devoted to cutting speed table for the various types of tools, but no cross reference is made to these supplementary data here.

Machinability Constants

Another instance of this lack of convenient cross references is given in connection with Tables 9 and 10, beginning on page 66. Machinability constants are presented for all the common materials, without giving any clue as to how they are derived or even defined. One would have to leaf back to page 57 in the chapter on "Materials Cut" to find the relative machinability of materials defined under the misleading subhead "Special Cautions." The mysterious constants K_m and K_p are also presented in Tables

9 and 10 and are referred to on the preceding page merely with the words (they) "have been determined from experimental data where such data were available and by interpolations for those metals not covered by experimental work." No clue is given as to what factor K_m may represent until one hunts through the back of the book and finds it briefly defined on page 254 as being a factor depending on the machinability of the metal cut, and on page 274 that K_p is a constant used in calculating the tangential cutting pressure that "appears to be a property of the material being cut"—a vague way of defining a set of empirical constants derived from experimental and operating data.

What this manual needs is a foreword labeled "How to Use This Book," in which the step by step calculations should be outlined with explicit reference as to where the tabular material is to be found. Perhaps the easiest way to answer this rhetorical question now is to turn to the examples of the use of the tables, given on pages 78 to 85. The first example given is unfortunate, however, since in solving the problem of the horsepower required for actual cutting, the answer is found to be one-fourth the assumed power to drive the machine idle. This example raises the whole question as to how valuable are tables of horsepower for every condition of speed, feed and depth of cut, except to the machine tool designer. With built-in motor drives, the horsepower available to drive a machine is a fixed factor, from a shop operating point of view, and the question of whether or not the motor can pull the tool load can be settled by cut and try at the machine in half the time it would take to make the calculations.

Besides, the chief question the shop man wants answered is the optimum speed, feed and depth of cut conditions for the most economical tool life. This question is not answered specifically in the manual, nor is it underscored in the tables, although the information is there if one wants to experiment with some formidable looking formulas. Nor is any attempt made to express metal removal in cubic inches per min. as related to economic tool life, but the basic data are there by which such calculations could be made. Unfortunately, the manual begins by assuming that a proper choice of feed and depth of cut has already been made, then proceeds to name the permissible speed for the selected conditions.

The examples given on page 78 to

85 look simple enough and one quickly picks out the proper values from the tables specifically named in the examples. But let the novice select his own conditions as covered in these tables; then he realizes how handy some thumb tabs would be in finding the particular table he wants among the 160 odd pages of them. There is logic in the arrangement of the tables, to be sure, but it will take considerable familiarity with the manual's context to be able to refer to the right table as quickly as the authors do.

Methods of Calculation

Let these assumed conditions fall outside the scope of the tables, then the calculator needs to refer to Part III of the manual, devoted to methods of calculation of cutting speed, chip pressure, horsepower and economic tool life for any given condition. A quick glance shows that the so-called field of machine shop arithmetic has been left far behind. Nothing more complicated than exponential equations are to be found, but the solutions of such equations require brushing up on the theory of logarithms, the dusting off of a book of logs, or the purchase of a log-log slide rule. This is meant to be no criticism of the committee. Such equations are the only way in which the many factors could be correlated, and the fact that these empirical formulas are complex and require tedious calculation for their

solution rather proves the thoroughness with which the whole subject was approached and tremendous detail involved in preparing the tables. Every conceivable factor relating to cutting tools, their shape, material and heat treatment is taken into account as well as the factors relating to the material being cut and the fact that a soluble cutting oil is being used, or not, as the case may be. This part of the book is for the student who wants to delve into the background work, and the production engineer is warned away from it by this reviewer.

It is here that some of the methods of presentation used in the reports of the Subcommittee on Cutting Fluids might prove valuable. We refer to the graphic method of plotting exponential formulas in the form of straight line "curves" on log-log coordinate paper. Some fundamental principles can readily be expressed in such charts, and interpolation and extrapolation are simple and well within the limits of errors admitted by the committee in the manual data. Summing up, this reviewer believes that there is a gold mine of information within the pages of this book, but that it will take considerable prospecting to uncover the nuggets—the general principles needed as a guide in solving the fundamental shop problem, namely, the proper choice of depth of cut and feed and the permissible speed for the most economic tool life.

... GREAT BRITAIN ...

... Sheet sales at one-third pre-war volume

LONDON, Nov. 21 (By Cable)—With the British war program now in full swing and the licensing system operating satisfactorily the renewal of commercial exports becomes practicable. Sheet makers are now encouraged by the effect of export sales in aggregate up to one third of the pre-war contracts.

Prices are fixed as follows: Black sheets maximum £15 12s 6d f.o.b. Empire markets, £15 12s 6d f.o.b. minimum other exports; galvanized sheets maximum, £18 2s 6d f.o.b. Empire markets, £18 2s 6d f.o.b. other markets minimum. Little business is expected at these bases as Belgian galvanized sheet mills are selling in belgas equivalent around £25.

There is a strong demand for scrap, but sales are limited by domestic shortage.

No British government steel con-

tracts have been placed in America yet but commercial business is developing.

There is marked activity in Continental steel with French and Belgian domestic priority demand increasing.

Cartel agreements are now officially suspended.

October imports of iron ore and scrap in the United Kingdom amounted to £822,000 and iron and steel totaled £1,082,000; exports of iron and steel amounted to £1,902,000.

Auto Registrations Heaviest Since 1929

DETROIT—October registration of new automobiles proved to be the heaviest since 1929, it is estimated by R. L. Polk & Co. on the basis of registration returns from 31 states. The estimate for the nation as a whole is 214,000, an increase of about 78 per cent over last year and 47 per cent better than September of this year.

Justice Department Warns of Steel "Errors," Makes 200 Mistakes of Its Own

A PAMPHLET, "Major Characteristics of the Iron and Steel Industry," prepared by the Department of Justice for the Temporary National Economic Committee as background for the TNEC in the steel industry hearing at Washington, contained more than 200 mistakes in fact, according to a check by THE IRON AGE. Some of the errors follow:

More than a hundred mistakes appear in the booklet tables on prices. While the Department of Justice used THE IRON AGE as the source for its table on "Base Prices of Selected Products," the base price per pound in many cases was calculated through use of net tons instead of gross tons. Sheet bar, for example, was carried at 1.70c. per lb. whereas THE IRON AGE quoted price was \$34 a gross ton or 1.52c. per lb. Prices of hot rolled, galvanized and cold rolled sheets, wire rods and semi-finished steel were also incorrect in the price tables. These mistakes made inaccurate an accompanying list of percentage changes in steel prices between May and July, 1938.

A table showing the range of base prices on various products on Sept. 8, 1938 carried the price of basic pig iron at Birdsboro, Pa., as \$21 instead of \$20.50 a ton, and the bright wire price at Pittsburgh as \$1.60 per 100 lb. instead of \$2.60.

Another table listing production totals in 1937 omitted a tonnage of 165,447 tons of hoops, cotton ties and baling bands, although carrying these items as 0.4 per cent of the total tonnage. The same table listed 2344 tons of heavy shapes as "alloy production" instead of carrying this total under "light shapes," and carried incorrect percentages for both light and heavy shapes in alloy production. The table also omitted alloy production tonnages for skelp, rails, rolled billets for forging and miscellaneous hot rolled products.

Table VII incorrectly carried the total of finished steel production in 1937 as 15,872,079 tons, instead of the correct figure of 15,332,449 tons. Incorrect percentages were carried on every product listed in this table, apparently a misreading of the annual statistical report for 1937 of the American Iron and Steel Institute.

Production of pig iron by states for

1937 gave Ohio as producing 22 per cent instead of 21.9 per cent. The 1937 production of coal by states incorrectly gave Pennsylvania anthracite output as 50,915,000 tons compared with actual output of 51,856,000 tons, and furnished a figure of 493,370,000 net tons instead of 494,311,000 as the total production of bituminous and anthracite coal in the U. S. in that year. Pennsylvania and Ohio are credited with producing almost 54 per cent of the nation's steel output in 1937, a figure which should have been 53 per cent. Indiana and Illinois produced nearly 21 per cent of the steel that year instead of "almost 23 per cent."

A table on "capacity for selected products by degree of company integration listed 11 errors, including incorrect tonnages and percentages of total production of cold rolled sheets and cold rolled strip from semi-integrated and non-integrated mills.

Other Errors

Twenty-five non-integrated makers of pig iron were operating in 1938 instead of 34 while the number of companies having capacity for making hot rolled products and pig iron was 149 instead of 158.

Table XVI listed incorrectly the invested capital of nine out of 10 large steel companies and consequently carried an incorrect total investment for the 10 companies as \$3,771,680,000 instead of the true total of \$3,699,480,000 as shown by pamphlet reports of the companies for 1937.

A long list of errors appeared in the Department of Justice table on "Concentration of Capacity in Major Producing Areas." Here the total finished hot rolled products capacity for the entire industry was carried as 52,799,580 gross tons against a true total of 54,926,600 tons and "further finished steel products" as 27,554,320 tons against 26,726,920 tons. The table gave inaccurate totals for the Pittsburgh district and listed incorrect tonnages and percentages for the Pittsburgh, Chicago and Birmingham district totals taken as a whole. Galvanized pipe capacity was carried twice in this table and elsewhere in the same compilation important products were left out entirely.

In another table Youngstown Sheet & Tube Co.'s percentage of capacity

for making heavy structural shapes was incorrectly given.

To show the capital turnover in the steel industry, as compared with other industries, the Department of Justice men who prepared the booklet computed the totals of sales, also the total of stocks, bonded debt and surplus for the years 1909 through 1938, then took an average by dividing by 20 years instead of 30 years. This resulted in incorrect figures from which the writers of the booklet incorrectly concluded that the average capital turnover rate for 1909-1938 was 1.6 years instead of 2.1 years.

Continuous Mill Capacities

More than 25 mistakes appeared in a table giving capacities of continuous sheet-strip mills installed or under construction in the U. S. by January, 1938. Apparently an old list of capacities was used, although new, revised totals of such capacities appeared in the Jan. 5, 1939, issue of THE IRON AGE. Inland Steel Co.'s 45-in. mill and Carnegie-Illinois Steel Corp.'s 43-in. McDonald mill were not included in the Department of Justice list, while the total capacity of the industry's continuous mills was given as 13,119,000 gross tons compared with the true total of 15,593,900 tons.

The number of sheet bar basing points under the NRA was incorrectly given on page 20 of the booklet.

On page 28 of the booklet the Department of Justice cautions its readers as follows:

"In interpreting the data presented in Table XXVI and Chart XI, three important qualifications should be borne in mind. First, the basic figures used are aggregates reported by the American Iron and Steel Institute. They have not been subject to check by the Department of Justice and may therefore contain errors."

Stainless-Machining Data Given by Slide Rule

A STAINLESS steel machinability "slide rule" incorporating the findings of two years of intensive research on the machining of stainless steel, has been produced by Rustless Iron & Steel Corp., Baltimore, for engineers fabricating the metal.

By setting the slide on the chart to the type of stainless steel to be machined, data on speeds, feeds, and cuts may be read directly. The reverse side of the chart carries suggestions as to tool design, grinding and coolants.

PERSONALS

CHARLES E. WILSON, who has been executive vice-president of the General Electric Co., Schenectady, N. Y., since December, 1937, has been elected president, and PHILIP D. REED, assistant to the president, has been elected chairman of the board, effective Jan. 1, succeeding GERARD SWOPE and OWEN D. YOUNG, who will become honorary president and honorary chairman of the board, respectively.

Mr. Wilson began his career in business as an office boy at the age of 13, with the Sprague Electric Co. in 1899, a former constituent company of GE. He went from office boy to shipping clerk, factory accountant, production manager, and then assistant superintendent of the factory in 1914. Shortly after that he was appointed sales manager. In 1918, the year following transfer of the conduit business from Sprague to General Electric, he became assistant general superintendent of the Maspeth, L. I., and New Kensington, Pa., works. Five years later he went to Bridgeport as managing engineer in charge of the conduit and wire business and in 1925 was appointed assistant manager of the Bridgeport works. Here he began his intimate association with the appliance business and in June, 1928, became assistant to the vice-president in charge of the merchandise department. Mr. Wilson was made manager of the merchandise department in charge of engineering, manufacturing and sales in 1930 and in December of that year was elected a vice-president of the company.

Mr. Reed joined General Electric in its law department in 1926. He holds degrees both in electrical engineering and law, having received the former from the University of Wisconsin in 1921, and his doctor of laws degree from Fordham University in 1924. While still a law school student, he became vice-president and patent counsel for the Van Heusen Products Co., New York. Two years after joining General Electric he was transferred to the incandescent lamp department, and from July 1, 1934, until his appointment as assistant to the president in December, 1937, he was general counsel for the lamp department.

In announcing their retirement, after having held their respective offices since 1922, Messrs. Swope and Young indicated that they were applying the

policy of retirement at 65 adopted during their administration.

WARDEN F. WILSON has been appointed general manager of sales, Lebanon Steel Foundry, Lebanon, Pa. He formerly was Pittsburgh district manager, American Steel Foundries. Upon his graduation in 1925 from the University of Illinois, Mr. Wilson joined American Steel Foundries as a special apprentice at its Indiana Harbor works. He was made night superintendent in 1928 and in 1929 became assistant to the works manager, holding this position until he became manager of the Pittsburgh works. A thesis on the Welding of Cast Steel won for him a degree of Professional Mechanical Engineer from the University of Illinois in 1937. He is a member of the American Society of Mechanical Engineers, the Engineers Society of Western Pennsylvania, and the American Foundrymen's Association.

BERNARD H. SWEENEY, former general superintendent of production control at Fisher Body Corp. No. 1 plant in Flint, Mich., has been made resident manager of the Fisher Body Plant in St. Louis, Mo.

JAMES L. BROWN, president and one of the organizers of the Trailer Coach Manufacturers' Association, has been

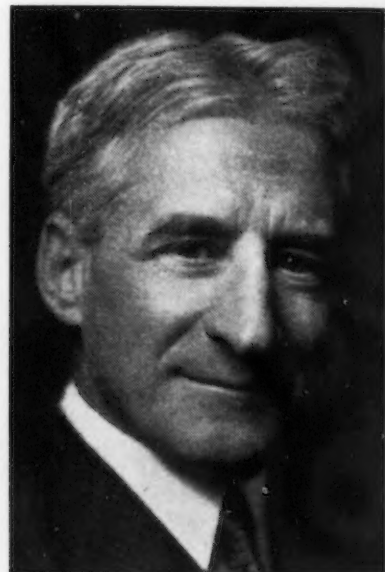
appointed manager of the trailer division of Hayes Body Corp., Grand Rapids, Mich.

H. C. McCASLIN, connected with the automobile industry since 1920, has been appointed chassis engineer for Willys Overland Motors, Inc. Formerly he worked with Oakland Motors, General Motors and Durant Motors.

RALPH HUBBART, former vice-president of Allied Products Corp., Detroit, has been elected president to succeed the late C. C. RICHARDS. W. E. RAY, secretary-treasurer, has been elected vice-president and secretary. J. F. HALM, formerly assistant secretary and assistant treasurer, now is treasurer and assistant secretary.

MONROE MESSINGER has been named assistant manager and chief purchasing agent of the Detroit division of Federated Metals Division of American Smelting & Refining Co. He succeeds CARL J. GROSS, who has been transferred to Whiting, Ind.

E. K. SMITH, of the Electro-Metallurgical Co., and P. S. LANE, of the Koppers Co., American Hammered Piston Ring div., will address a joint dinner meeting of the Society of Automotive Engineers and the American Foundrymen's Association on Dec. 4 at the Hotel Statler, Detroit. Their subject will be "Relationship Between Hardness, Microstructure and Wear of Cylinder Bores and Rings."



C. E. WILSON (left), new president of General Electric Co., and GERARD SWOPE (right), whom he succeeds.

P. J. POTTER, vice-president in charge of engineering, production and sales of the Pangborn Corp., Hagerstown, Md., has been elected president of the Foundry Equipment Manufacturers' Association. He received his early business training with the Michigan Steel Castings Co., which he left in 1915 to represent the Pangborn Corp. in the Detroit territory. The following year the territory was enlarged to include all of the Central and Western States. In 1921, Mr. Potter was appointed works manager at the home plant in Hagerstown and sales director in 1932. He was made vice-president in charge of engineering, production and sales in 1935.

♦ ♦ ♦

HERBERT G. MOULTON, consulting engineer, New York, has been elected president of the American Institute of Mining and Metallurgical Engineers. ERLE V. DAVELER, vice-president of the Utah Copper Co., and W. M. PEIRCE, chief of research, New Jersey Zinc Co., have been elected vice-presidents.

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J. B. SPOTSWOOD, who will resign as branch operating manager of the Chicago office of the United States Rubber Co., plans to retire from active business, effective Nov. 30. W. J. LALIBERTE, who has been branch operating manager at Kansas City, will succeed Mr. Spotswood at Chicago, and he will in turn be succeeded at Kansas City by C. A. GRAY, heretofore branch operating manager at Buf-

falo. H. A. DATHE, for the past several years a member of the New York staff, has been transferred to the Buffalo office as branch operating manager.

♦ ♦ ♦

A. W. PRIDE, heretofore sales manager of the Emeryville, Cal., porcelain department of the Westinghouse Electric & Mfg. Co., has been made manager of that department, succeeding J. W. RYAN, formerly superintendent of the works, who has retired.

♦ ♦ ♦

DON L. WINCHELL, previously employed in metallurgical work at the Canton and Massillon works of Republic Steel Corp., has become a research engineer on the staff of Battelle Memorial Institute, where he will be engaged in research in process metallurgy. ROBERT R. ADAMS, a graduate in chemical engineering of Antioch College, has been assigned to research in process metallurgy.

♦ ♦ ♦

J. F. TAIT, who has been associated with Bucyrus-Erie Co., Milwaukee, for 22 years, for part of that time as assistant manager for the Eastern sales district, with offices in Philadelphia, has been made district manager of the Pittsburgh sales district. He succeeds P. B. HEISEY, who resigned to enter business for himself.

♦ ♦ ♦

HERBERT C. STOCKHAM, president of the Stockham Pipe Fittings Co., Birmingham, has been elected president of the Associated Industries of Alabama.

SAMUEL W. GRAY has been named general manager of the Marvel-Schebler Carburetor Division of the Borg-Warner Corp. at Flint, Mich. CARL M. KALTWASSER, former general manager, now is attached to the general office of the corporation.

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B. M. SCHAEFER, manager of the hydraulic department, Twin Disc Clutch Co., Racine, Wis., spoke on "Hydraulic Drives in Industrial Service" at a meeting Nov. 17, before the Milwaukee section of the SAE.

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FRANK J. LEAHY, for the past two years in charge of publicity and public relations at the Bethlehem Steel Co.'s Fore River shipbuilding works, has been made management's special representative in charge of industrial relations, personnel and publicity. Mr. Leahy is a native of Cambridge, Mass., was educated in the schools of that city and was graduated from the Northeastern University Law School. He is a member of the Massachusetts and Federal bars.

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C. M. DAVIS spoke on Nov. 14 before the Detroit section, American Society of Mechanical Engineers, on new types of turbine-electric locomotives. The meeting was held in the auditorium at the Detroit Edison Building.

♦ ♦ ♦

JAMES W. BARR, for many years with the New York office of George S. May Co., industrial management engineer, has joined the Vandyck Churchill Co., New York machine tool dealer, as sales engineer. He will cover the northern New Jersey territory for the company.

♦ ♦ ♦

SIDNEY ALBERT, of Albert Brothers, Waterbury, Conn., has been elected president of the Southern New England chapter of the Institute of Scrap Iron and Steel Inc. ROBERT JACOB, of Jacob Brothers Inc., Bridgeport, Conn. has been elected vice-president, and S. SAMUEL KASDEN, of H. Kasden & Sons Inc., New Haven, Conn., has been reelected secretary-treasurer.

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JAMES A. PEARSE, formerly assistant purchasing agent of the Reo Motor Car Co., Lansing, Mich., has joined the sales department of the Ohio Steel & Supply Co., Cleveland.

♦ ♦ ♦

CLAYTON P. INNES, who has had many years of field experience in the application of motors and motor control, has been made representative in



P. D. REED (left), chairman of the board of General Electric, and OWEN D. YOUNG (right), who retires as chairman Jan. 1.

the Omaha territory for Cutler-Hammer, Inc., Milwaukee. He received his electrical engineering degree from South Dakota State College.

♦ ♦ ♦

ANTHONY THEOLOGUS has been appointed engineer in charge of design and development by the Verson All-steel Press Co., Chicago.

♦ ♦ ♦

C. S. FINEGAN, formerly identified with the Ingalls Iron Works Co., Birmingham, as general sales manager, has been made assistant general manager of the J. B. Beaird Corp., Shreveport, La. He received his engineering degree from the University of Alabama.

♦ ♦ ♦

JOHN M. LUTZ has become associated with the Chicago sales division of the Continental Roll & Steel Foundry Co., East Chicago, Ind.

... OBITUARY ...

CHARLES H. ELLIOTT, 61, assistant vice-president in charge of operations, Republic Steel Corp., was found dead in his room at Hotel Statler, Buffalo, Nov. 16, after a heart attack. Mr. Elliott, a veteran of service with five steel companies, had occupied the assistant vice-presidency of Republic since May, 1937.

He was born in Wilmington, Ohio, and was educated at Wooster College and Purdue University, where he



CHARLES H. ELLIOTT, late assistant vice-president in charge of operations, Republic Steel Corp.

studied engineering. He was vice-president of Trumbull Steel Co., Warren, and joined Republic Steel when it absorbed the Trumbull company in 1926. Prior to that time he had been associated with Youngstown Sheet & Tube Co., Weirton Steel Co. and Jones & Laughlin Steel Corp. At the time he was appointed to the assistant vice-presidency he was manager of Republic's Youngstown-Warren district.

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RALPH S. MACPHERRAN, chief chemist of Allis-Chalmers Mfg. Co., Milwaukee, for many years, whose retirement was reported in the Nov. 9 issue of THE IRON AGE, died Nov. 13 at Duluth. Identified with the iron and steel industry for nearly 50 years, he was especially noted as an outstanding metallurgist in the field of gray iron. In 1931 he received the J. H. Whiting gold medal award of the American Foundrymen's Association.

Mr. MacPherran was born at Sterling, Ill., in 1871. He received his technical education at the University of Wisconsin and the University of Michigan, graduating from the latter institution in 1892 with the degree of Bachelor of Science in chemistry. He spent three years with the Illinois Steel Co. at its Joliet and South Chicago works. He joined the Allis-Chalmers organization in 1895, having started with the old E. P. Allis Co.

Mr. MacPherran contributed numerous papers and articles on the metallurgy of gray iron and steel to technical organizations and trade journals, and was a member of a group of American foundrymen who visited Europe in 1939 to attend the International Foundrymen's Congress.

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FRANK W. HOLT, purchasing agent for the Erie Railroad Co. in Cleveland, died at Lakeside Hospital, Cleveland, Nov. 9, aged 54 years. Mr. Holt was born in Ridgewood, N. J., and was graduated from Pratt Institute, Brooklyn. He began work as an office boy for the Erie Railroad in New York in 1903. In July, 1931, he became assistant purchasing agent, with headquarters at Cleveland, and in July, 1939, was made purchasing agent.

♦ ♦ ♦

DAVID DANGLER, one of the founders of the Dangler Stove Co., Cleveland, now a division of the American Stove Co., and a former vice-president of the latter company, died in Cleveland, Nov. 17, at the age of 82. He entered the stove business in 1878.

CHARLES E. COLMAN, president of the La Crosse (Wis.) Tractor Co., died at a Milwaukee hospital following a sudden illness. In addition to his association with the Tractor firm, Mr. Colman was also active in numerous other business organizations at La Crosse. He was 45 years old.

♦ ♦ ♦

CARL BEHN, an automotive engineer widely known in the industry at Detroit, died Nov. 15 in Long Meadow, a suburb of Springfield, Mass., after an illness of three weeks. Mr. Behn was a resident of Detroit for 12 years, employed by the United American Bosch Corp. until his transfer to Springfield, Ohio, and then in 1938 to Springfield, Mass. He was 43 years old and a member of the American Society of Mechanical Engineers and a vice-president of the Society of Automotive Engineers. He was vice-president in charge of sales of the American Bosch Corp.

♦ ♦ ♦

MATTHIAS E. CUNNINGHAM, president of the Waltham Grinding Wheel Co., Waltham, Mass., died suddenly of a heart attack on Nov. 6 at his home in that city.

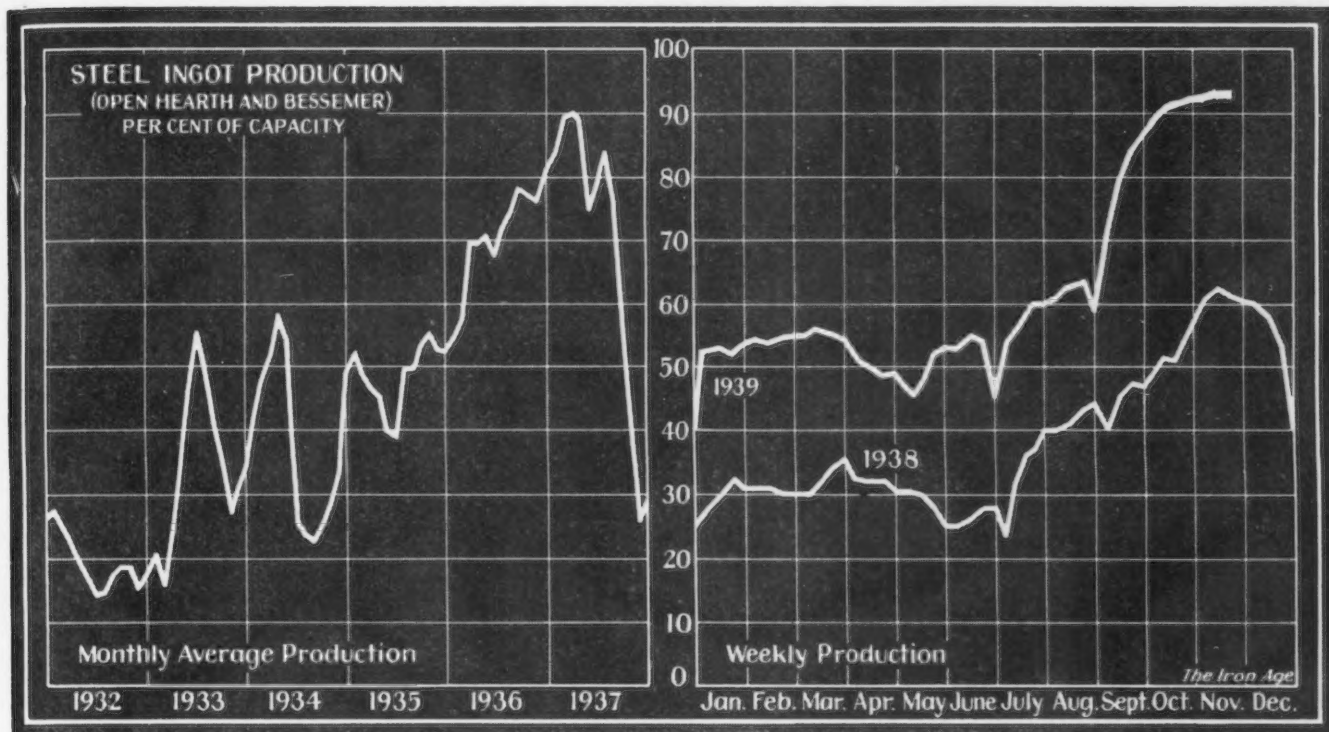
♦ ♦ ♦

HARRIET FISHER ANDREW, owner of the Fisher & Norris Anvil Works, Trenton, N. J., died at her home in Ewing Township on Nov. 16, aged 72 years. She learned the foundry business after inheriting the anvil works from her husband.



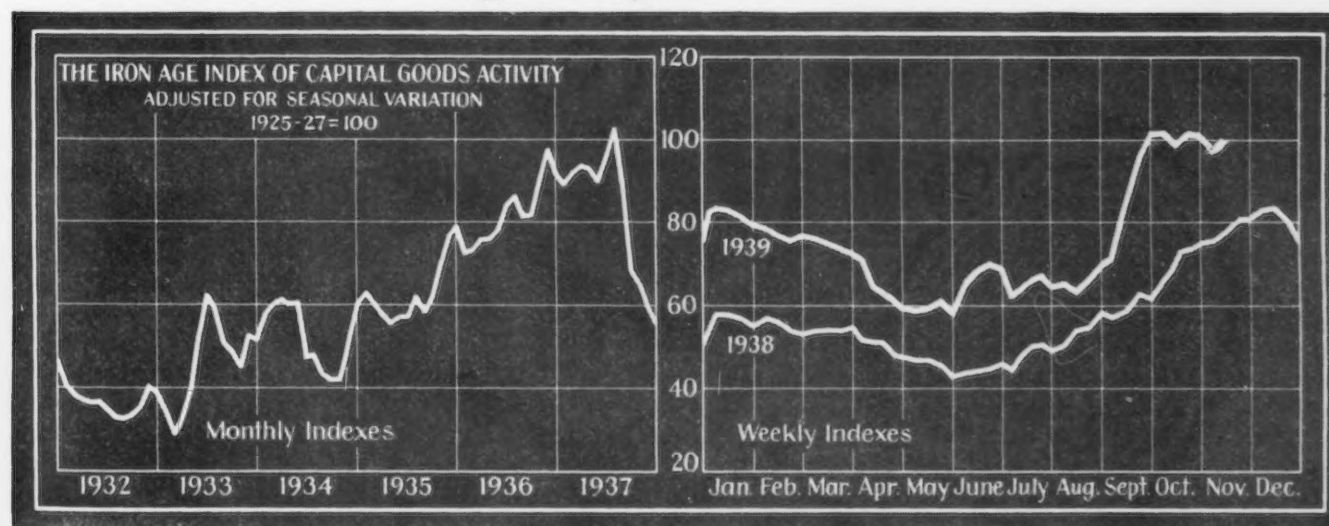
R. S. MacPHERRAN, late chief chemist of the Allis-Chalmers Mfg. Co.

Ingot Rate Holds at 93½% of Capacity



District Ingot Production, Per Cent of Capacity	Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio River	Western St. Louis	East-ern	Aggregate
CURRENT WEEK..	93.0	94.5	91.0	86.0	86.0	97.0	93.0	100.0	86.0	85.0	84.0	95.0	93.5
PREVIOUS WEEK..	93.0	94.0	94.0	83.0	89.0	94.5	93.0	100.0	88.0	89.5	85.0	92.0	93.5

Combined Index Edges Higher, but Auto Factor is Lower



ALL the industries covered by THE IRON AGE index of activity continue to show improved operations with the exception of the strike-bound automobile industry. In the past week all the components of the index moved upward but the automobile series, which dropped 9.8 points to a level substantially below the 1938 level at this time. The gains of the other four components, however, were sufficient to overcome the drop in the automobile index and the combined index number moved up to 99.9, as compared with 99.5 in the preceding week. Activity in the Pittsburgh area reached a new high in the past week, and heavy construction awards, totaling \$96,416,000, represented the second highest weekly volume reported this year. Both public and private awards shared in the week's rise. As the index now stands, both the steel production and the Pittsburgh factors are above their

respective 1929 levels, while the combined index stands only 3.5 points below its 1929 position. Resumption of production by the struck Chrysler plants should boost the combined figure above the 1929 comparison.

	Week Ended Nov. 18	Week Ended Nov. 11	Comparable Week	
			1938	1929
Steel ingot production ¹	138.5	136.3	90.4	102.2
Automobile production ²	89.6	99.4	93.9	81.0
Construction contracts ³	81.3	76.2	80.0	110.3
Forest products carloadings ⁴	72.5	70.7	55.2	115.0
Production and shipments, Pittsburgh District ⁵	117.5	115.0	69.2	108.5
Combined index	99.9	99.5	77.7	103.4

Sources: ¹ THE IRON AGE; ² Ward's Automotive Reports; ³ Engineering News Record; ⁴ Association of American Railroads; ⁵ University of Pittsburgh.

... SUMMARY OF THE WEEK ...

... Delivery periods shorten for some products, but fresh buying continues.

o o o

... Ingot production unchanged at 93.5 per cent, as four districts lose, four gain.

o o o

... Scrap shows further weakness, composite price dropping 25c. to \$19.58.

EVIDENCE is accumulating that the steel industry's rate of ingot production, unchanged this week at 93.5 per cent, will continue to the end of the year with little variation and that January output likewise will be high. Even at this date, new orders, as distinguished from specifications being received against old commitments, apparently are heavy enough to support operating rates ranging from 65 to 80 per cent. When heavy backlogs piled up in the last few months in most products are taken into account, strong mill schedules for at least the first part of the first quarter seem assured.

This week ingot production tapered at some centers, with Youngstown off three points to 91 per cent, Cleveland down three points to 86 per cent, the Birmingham district down two points to 86 per cent and the southern Ohio River district four and a half points lower at 85 per cent. Offsetting these declines, which are characteristic of periods of such heavy pressure for deliveries, are gains of a half point to 94.5 per cent at Chicago, three points to 86 per cent at Philadelphia, two and a half points to 97 per cent at Buffalo and three points to 95 per cent in the Eastern area. The large Pittsburgh district reports operations unchanged at 93 per cent, while Detroit is holding at 100 per cent of capacity and the Wheeling-Weirton district continues at 93 per cent.

DURING the last week, delivery periods have been shortened on structural materials, tubular goods and some other products but order backlogs have not been reduced appreciably in sheets and strip, bars and railroad material. A decline during the remaining weeks of 1939 in the volume of fresh steel orders is to be expected but the tonnage of such business probably will be larger than the mills anticipated a month

ago, due largely to a desire by steel consumers to keep their inventories up to normal. A factor in mill schedules during the next few months will be steel requirements at the now idle Chrysler plants, where a settlement of the United Automobile Workers strike is momentarily expected. Suppliers, including steel manufacturers, are cooperating to permit a speeding-up of Chrysler operations when the strike is ended, and early attainment of something like 20,000 units per week from that company is expected. Part of Chrysler's needs may be filled from steel in storage.

During the last few days, agitation over first quarter steel quotations has subsided, with many observers in the steel industry looking for an early reaffirmation of prices which would show only minor adjustments for the first quarter. Weakness in the scrap market, however temporary, apparently has had a bearing on the position of some steel producers that higher costs of raw materials such as scrap must necessarily be followed by a general advance in steel prices. Since Oct. 3, when the high point of \$22.50 for the year was reached, THE IRON AGE scrap composite price has declined a total of \$2.92 a ton, or 13 per cent. This week the scrap composite stands at \$19.58, a decline from last week of 25c. in a market showing light sales in most districts. The current domestic market softness in scrap is attributed to a general lack of mill buying, and an upturn is looked for when present commitments near an end.

MEANWHILE iron ore consumption continues to advance, the October total of Lake Superior ore being 5,270,707 tons, highest since the August, 1937, consumption total of 5,373,264 tons, according to the Lake Superior Iron Ore Association. Consumption for the first ten months of 1939 was 33,344,946 tons compared with 19,512,277 tons in the corresponding period of last year.

Pig iron shipments to the merchant trade are approximately two and a half times those of the period immediately preceding Sept. 1, while furnaces are now getting into shipments of business taken at the \$23 base in the North and the \$19 base in the South.

Structural steel awards are again lower at 9000 tons, against 14,850 tons last week, but new structural projects are higher at 18,000 tons compared with 16,900 tons. Outstanding inquiries include 4500 tons for a Federal building at San Francisco. Reinforcing steel awards advanced to 11,450 tons from 9300 tons last week and new projects are higher at 14,825 tons.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 21, 1939	Nov. 14, 1939	Oct. 24, 1939	Nov. 22, *1938
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$40.00
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Reroiling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	43.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:	Nov. 21, 1939	Nov. 14, 1939	Oct. 24, 1939	Nov. 22, *1938
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.00	2.00	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.00	2.00	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Cents Per Lb.:	Nov. 21, 1939	Nov. 14, 1939	Oct. 24, 1939	Nov. 22, *1938
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.55	2.55	2.55	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	3.40	3.40	3.40	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	\$5.00	\$5.00	\$5.00	\$5.00

*Pittsburgh prices only.
†Applies to 80-rod spools only.
‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:	Nov. 21, 1939	Nov. 14, 1939	Oct. 24, 1939	Nov. 22, *1938
No. 2 fdy., Philadelphia	\$24.84	\$24.84	\$24.84	\$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Perromanganese, seab'd carlots	100.00	100.00	100.00	92.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Nov. 21, 1939	Nov. 14, 1939	Oct. 24, 1939	Nov. 22, *1938
Heavy melting steel, P'gh...	\$20.75	\$21.25	\$22.50	\$15.50
Heavy melting steel, Phila...	20.75	20.75	21.75	14.75
Heavy melting steel, Ch'go...	17.25	17.50	18.375	14.75
Carwheels, Chicago	16.50	17.50	17.75	13.00
Carwheels, Philadelphia	21.25	21.25	22.25	16.75
No. 1 cast, Pittsburgh	20.75	21.25	22.75	15.50
No. 1 cast, Philadelphia	22.25	22.25	24.25	16.75
No. 1 cast, Ch'go (net ton)	15.00	15.75	16.25	12.75

Coke, Connellsville

Per Net Ton at Oven:	Nov. 21, 1939	Nov. 14, 1939	Oct. 24, 1939	Nov. 22, *1938
Furnace coke, prompt	\$5.00	\$5.00	\$5.00	\$3.75
Foundry coke, prompt	5.75	5.75	5.75	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:	Nov. 21, 1939	Nov. 14, 1939	Oct. 24, 1939	Nov. 22, *1938
Copper, Electrolytic, Conn...	12.50	12.50	12.50	11.25
Copper, Lake, New York	12.50	12.50	12.50	11.375
Tin (Straits), New York	**52.00	**51.00	**55.00	46.00
Zinc, East St. Louis	6.50	6.50	6.50	4.75
Zinc, New York	6.89	6.89	6.89	5.14
Lead, St. Louis	5.35	5.35	5.35	4.95
Lead, New York	5.50	5.50	5.50	5.10
Antimony (Asiatic), N. Y.	16.50	16.50	14.00	14.00

**Nominal.

The Iron Age Composite Prices

Finished Steel

	Nov. 21, 1939	One week ago	One month ago	One year ago
2.236c. a Lb.	2.236	2.236	2.236	2.286
Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.				
HIGH	2.286c., Jan. 3	2.236c., May 16	2.512c., May 17	2.211c., Oct. 18
1939	2.512c., Mar. 9	2.249c., Jan. 4	2.512c., Mar. 9	2.249c., Jan. 4
1938	2.249c., Dec. 28	2.016c., Mar. 10	2.249c., Dec. 28	2.016c., Mar. 10
1937	2.062c., Oct. 1	2.056c., Jan. 8	2.062c., Oct. 1	2.056c., Jan. 8
1936	2.118c., Apr. 24	1.945c., Jan. 2	2.118c., Apr. 24	1.945c., Jan. 2
1935	1.953c., Oct. 3	1.792c., May 2	1.953c., Oct. 3	1.792c., May 2
1934	1.915c., Sept. 6	1.870c., Mar. 15	1.915c., Sept. 6	1.870c., Mar. 15
1933	1.981c., Jan. 13	1.883c., Dec. 29	1.981c., Jan. 13	1.883c., Dec. 29
1932	2.192c., Jan. 7	1.962c., Dec. 9	2.192c., Jan. 7	1.962c., Dec. 9
1931	2.223c., Apr. 2	2.192c., Oct. 29	2.223c., Apr. 2	2.192c., Oct. 29
1930	2.192c., Dec. 11	2.142c., July 10	2.192c., Dec. 11	2.142c., July 10
1929				
1928				

Pig Iron

	Nov. 21, 1939	One week ago	One month ago	One year ago
\$22.61 a Gross Ton	22.61	22.61	22.61	20.61
Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.				
HIGH	\$22.61, Sept. 19	\$20.61, Sept. 12	23.25, June 21	19.61, July 6
1939	23.25, Mar. 9	20.25, Feb. 16	23.25, Mar. 9	20.25, Feb. 16
1938	19.73, Nov. 24	18.73, Aug. 11	19.73, Nov. 24	18.73, Aug. 11
1937	18.84, Nov. 5	17.83, May 14	18.84, Nov. 5	17.83, May 14
1936	17.90, May 1	16.90, Jan. 27	17.90, May 1	16.90, Jan. 27
1935	16.90, Dec. 5	13.56, Jan. 3	16.90, Dec. 5	13.56, Jan. 3
1934	14.81, Jan. 5	13.56, Dec. 6	14.81, Jan. 5	13.56, Dec. 6
1933	15.90, Jan. 6	14.79, Dec. 15	15.90, Jan. 6	14.79, Dec. 15
1932	18.21, Jan. 7	15.90, Dec. 16	18.21, Jan. 7	15.90, Dec. 16
1931	18.71, May 14	18.21, Dec. 17	18.71, May 14	18.21, Dec. 17
1930	18.59, Nov. 27	17.04, July 24	18.59, Nov. 27	17.04, July 24
1929				
1928				

Steel Scrap

	Nov. 21, 1939	One week ago	One month ago	One year ago
\$19.58 a Gross Ton	19.83	20.875	15.00	
Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.				
HIGH	\$22.50, Oct. 3	\$14.08, May 16	15.00, Nov. 22	11.00, June 7
1939	21.92, Mar. 30	12.92, Nov. 10	21.92, Mar. 30	12.92, Nov. 10
1938	17.75, Dec. 21	12.67, June 9	17.75, Dec. 21	12.67, June 9
1937	13.42, Dec. 10	10.35, Apr. 29	13.42, Dec. 10	10.35, Apr. 29
1936	13.00, Mar. 13	9.50, Sept. 25	13.00, Mar. 13	9.50, Sept. 25
1935	12.25, Aug. 8	6.75, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1934	8.50, Jan. 12	6.43, July 5	8.50, Jan. 12	6.43, July 5
1933	11.33, Jan. 6	8.50, Dec. 29	11.33, Jan. 6	8.50, Dec. 29
1932	15.00, Feb. 18	11.25, Dec. 9	15.00, Feb. 18	11.25, Dec. 9
1931	17.58, Jan. 29	14.08, Dec. 3	17.58, Jan. 29	14.08, Dec. 3
1930	16.50, Dec. 31	13.08, July 9	16.50, Dec. 31	13.08, July 9
1929				
1928				

THIS WEEK'S MARKET NEWS

NEW BUSINESS

... Specifications equal shipments but new orders taper

The volume of specifications at PITTSBURGH, which includes releases against previous commitments as well as recently placed orders, although somewhat below September and early October levels is, nonetheless, equal to or in excess of actual shipments. Because of this condition, producers are still unable to make headway in reducing total backlogs, although unfilled tonnage is in some product lines being slowly cut down. It is to be expected that the volume of fresh steel orders will show a declining tendency in the remaining weeks of the year, but the magnitude of such business will probably be larger than mills anticipated a month ago owing to the almost universal forward buying policy being practised by consumers. Heavy backlogs of sheets, bars, and railroad material preclude any serious drop in operations during the first quarter of 1940, and the belief is growing that steel industry activity will only recede during the first part of 1940 to a point consistent with general business conditions.

There is no indication that steel consumers will let their inventories decline unless unforeseen adverse conditions affect business in general. Meanwhile, hot rolled sheet producers are practically booked for the entire first quarter while a large part of bars, strip, and plate capacity is already earmarked.

With steel consumers around CLEVELAND covering their first quarter requirements generously, new business for mills has been so brisk that order backlogs are unreduced in hot rolled strip, small size bars and certain types of bolts and nuts. Progress has been made toward improving deliveries in a few items such as structural materials, plates and merchant pipe. This latter development will tend to free raw steel for mills more hard pressed. In the aggregate, new business at CLEVELAND is roughly equivalent to 65 per cent of production. Shipments are at a peak and with few exceptions the material is reported going into immediate use upon delivery.

Pressure has increased from certain automotive manufacturers seeking quicker shipments. While considerable steel is being stored in DETROIT pending settlement of the automotive labor trouble, certain parts makers would need material quickly in order to resume operations without delay.

The combination of fresh orders and specifications against previous commitments is enabling CHICAGO mills generally to book as much tonnage from week to week as they are shipping. Actual new business volume alone, however, would permit the reduction of backlogs. One large mill operating at over 100 per cent of capacity reports that new orders would support 80 per cent operations. At most mills bookings consist largely of specifications against orders. Over the past few weeks, the new tonnage entered has been remarkably constant. November to date is behind October, a 20 per cent decline being reported from one important CHICAGO sales office.*

First quarter rolling schedules on sheets are already filled at some CHICAGO mills, while bar capacity is accounted for from a minimum of through January up to March. The largest producer of merchant bars in this area has sufficient first quarter tonnage to schedule its various bar mills an average of one month into 1940.

The current volume of new business being booked by PHILADELPHIA sellers is estimated to be roughly equal to between 60 and 70 per cent of ingot capacity. Warehouse interests are still buying fairly heavily, but miscellaneous demand has tapered sharply over the past several weeks. Most of the larger producers are fairly well booked through the first quarter on sheets, strips and bars, but the smaller independent producers in Eastern Pennsylvania have only now begun to go into the first quarter, and that to a very limited degree. In certain directions, cold finished bars may still be obtained for shipment in this quarter, as can, to a lesser extent, certain sizes of standard pipe. A feature of the present situation is the sustained demand for both oil country and standard pipe. The export market has quieted down considerably and it is reported

that the 2.70c. price on plates has been shaded on several recent Continental sales.

New steel business in the SOUTHERN OHIO district seems to be confined to coverage for first quarter with the larger companies now coming into the market. Warehouse business continues to be brisk and the machine tool business is still very active. By and large the market picture has not changed definitely in the past week.

With CIO's Harry Bridges voicing labor's demands, San Francisco's port is again tied up with no peace in sight. WEST COAST steel fabricators and consumers are deeply concerned.

PRICES

... First quarter prices likely to be unchanged; announcement soon

THE impression continues to gain that steel prices for the first quarter will be unchanged, with only minor adjustments likely, possibly for tin plate and such products as galvanized sheets. A price announcement is expected shortly.

Independent plate mills in eastern Pennsylvania, which are now quoting 2.40c., Philadelphia, on plates, have accepted some first quarter business, specifying that the price being quoted by the individual company at time of shipment will prevail. Tapering in export plate demand has been accompanied by some slight weakness in quotations to Continental buyers. The 2.70c., f.a.s., price prevailing for the past month on export plates has been shaded in one or two instances on sales there, but on South American business the 2.70c. price is very firm.

The probability of some sort of a realignment in the price relationship between hot rolled sheets, single pickled annealed sheets, and mill run cold rolled sheets is reason enough to look for an adjustment in the base price of hot rolled sheets when first quarter prices are announced. An upward revision in the base price of hot rolled sheets and an adjustment in certain processing extras would bring these three products into an alignment consistent with production conditions and it would be logical to expect such a move.

OPERATIONS

... Gains offset losses, output holds at 93.5 per cent

FOUR steel-producing centers reported narrow declines in ingot output for the current week but four other areas scheduled slight increases in production so that the melting rate remains unchanged from last week at 93½ per cent.

Plant managers now look for operations to hold at or near the present level through January, with a possibly tapering off in February.

The PITTSBURGH district is operating unchanged at 93 per cent, DETROIT at 100 per cent, and the WHEELING district at 93 per cent. CHICAGO's rate has increased one half point to 94.5 per cent, PHILADELPHIA three points to 86 per cent, BUFFALO 2½ points to 97 per cent, and the EASTERN area three points to 95 per cent. Districts reporting declines were YOUNGSTOWN, three points to 91 per cent, CLEVELAND, three points to 86 per cent, SOUTHERN, two points to 86 per cent and the SOUTHERN OHIO RIVER 4½ points to 85 per cent.

PIG IRON

... November shipments run ahead of October

PIG iron shipments in the PITTSBURGH district are in most cases exceeding those made in the same period last month. Miscellaneous merchant business is holding up well and there are indications of a further pick-up. Releases against orders are fairly heavy from non-integrated steel makers. While no producer has named first quarter prices, there is only a remote possibility that they will be higher than present quotations.

CLEVELAND and YOUNGSTOWN sellers report shipments are still in excess of production. Settlement of the automotive labor trouble in Detroit would assist deliveries farther. With few exceptions all the material being delivered at present is reported going into the melt and some users have boosted their ratio to around 70 per cent pig iron. Foundry coke deliveries remain easier than a month ago. First quarter pig iron sales are light.

CHICAGO district pig iron shipments are at a slightly higher rate than a month ago. Foundry coke shipments so far this month are about equal with the same period of September. Nearly all types of foundries in the CHICAGO

area, with the exception of the general jobbing shops, are well filled. Some of the latter, however, are not even working a full five days each week. Great activity is reported from foundries supplying the automobile, machine tool and farm equipment industries.

The pig iron market is quiet in CINCINNATI. Shipments on contract are going forward at good rate and furnaces indicate that the rule against rewriting for the next quarter will be definitely adhered to this year. The melt generally seems to be off a bit. Stove foundries are definitely slow and labor trouble in the Detroit area is retarding the automotive melt. Machine tool and steel car foundries, however, are very active and account for the majority of market melt at this time.

Demand continues good at BUFFALO. Producers express themselves as being well satisfied with business as the season for lake shipments begins drawing to a close. Spectacular features are absent from the market but consuming industries continue to maintain good operating rates and are placing orders accordingly.

The trade in St. LOUIS is uncertain as to whether there will be an advance in prices for first quarter shipments, although there is some talk of an increase. In the meantime, shipments continue at a lively rate, greater even than the heavy movement of 1937.

There has been a fair amount of new business placed in the NEW YORK district by melters who had not foreseen their full requirements when they placed contract business early in September. On the other hand, some of the jobbing foundries report a falling off in orders for castings. Backlogs are substantial, however, and melting rates have not been cut. Machine tool foundries are at peak operations and are farming out a considerable amount of work to avoid overtime penalties. BUFFALO furnaces are rushing shipments to the Hudson River before the State Barge Canal is officially closed on Nov. 25.

Several buyers in the PHILADELPHIA area have indicated interest in first quarter requirements, but thus far this interest has taken the form of investigations into the supply possibilities of that period rather than actual inquiries. It is expected that first quarter books here will be opened without formal announcement. It is unlikely that any rush to cover will follow the opening as most customers bought sufficient supplies previous to the last price rise

to cover their needs well into the coming quarter. Quotations on export inquiries range between \$25.50 and \$26, f.a.s.

SEMI-FINISHED STEEL

... Backlogs unchanged from month ago

INCOMING specifications at PITTSBURGH are just about even with outgoing shipments, with the result that backlogs are practically unchanged from a month ago. Prices on first quarter shipments are expected to be announced soon and the probability is that there will be no change from present quotations.

STRUCTURAL STEEL

... Awards for week drop to 9000 tons

STRUCTURAL steel lettings are again lower at 9000 tons, comparing with 14,850 tons last week. With the exception of 1600 tons for a central office building in Washington for the Navy Department, the bulk of awards is in small tonnages.

New structural projects are slightly higher at 18,000 tons as against 16,900 tons in the previous week. Outstanding inquiries include 4500 tons for a Federal appraiser's and immigration building at San Francisco; 3400 tons for bearing piles for the Sepulveda Dam, Los Angeles; 3000 tons for an engineering shop at Hickam Field, Hawaii, and 2600 for six bridges in Illinois.

MERCHANT BARS

... Reduction of small sizes backlog remains slow

PRODUCTION is nearing full turn in the CLEVELAND and YOUNGSTOWN districts, due to additional raw material available from mills where deliveries are improving, such as structural mills. Progress in reducing backlogs on small bar sizes is only slow, however. Buying for first quarter on the p.i.e. basis is steady but possibly not as heavy as in other districts.

Bar makers at PITTSBURGH are booked well into the first quarter and although shipments have been increasing recently, there has still been no major dent made in mill backlogs. It is expected, however, that unfilled ton-

nage will be reduced moderately within the next month at least, owing to the heavy volume of shipments and the lower level of fresh orders being placed. New business appears to be geared with general business conditions and reflects a definite forward buying policy on the part of most steel consumers.

Bookings in the CHICAGO district continue little changed from the past few weeks. Tractor and implement makers, and forgers are among the most active consumers in this market. One sales office booked a heavier tonnage of bars last week than any other product, the agricultural machinery plants being chiefly responsible. Commitments and actual orders have filled first quarter schedules into February.

PLATES

... Order books less extended on some grades

PLATE mill order backlogs are less extended but CLEVELAND and YOUNGSTOWN producers using their continuous strip mills for light plates remain hard pressed to meet all the demands upon their facilities. Delivery promises on ordinary carbon plates without special analysis or processing have improved.

Since steel requirements for an estimated 30,000 freight cars have not yet been placed for first quarter delivery, any concern that may have been felt in CHICAGO over first quarter plate business has been removed. In addition to the railroad car builders, considerable tonnage is being placed for car repair programs. Structural plate fabricators are not exceptionally busy at present but after the first of the year orders from this source are expected to increase.

Sheared plates are at a premium over the balance of this quarter in Philadelphia as practically every producing interest in EASTERN PENNSYLVANIA is now well booked through December. However, certain odd sizes of the sheared grade and all types of universal plates can be obtained with delivery in two to three weeks. General miscellaneous demand in Philadelphia declined further in the past week, but warehouse buying continues at a fast pace. The smaller independent mills are accepting some first quarter business, with the stipulation that the price being quoted at time of shipment by the individual mill concerned will

prevail. Export bookings are at a moderate pace, with France currently interested in a fair tonnage of boiler plate. There has been some shading of the 2.70c. price on recent Continental business, but all South American activity is firmly on the 2.70c., f.a.s., basis.

BOLTS, NUTS AND RIVETS

... Output believed going quickly into consumption

Even though volume is reduced from September, new orders are so brisk that some companies have been unable to reduce backlogs on the popular sizes recently. Reordering to replace exhausted stocks, fill-in buying in sizes overlooked during the September rush, and protective business in anticipation of good first quarter operations, constitute the bulk of the incoming volume. Consumers appear to be using up shipments promptly upon receipt.

SHEETS AND STRIP

... Shipments at peak for Ohio mills

SHIPMENTS are at a peak at CLEVELAND and YOUNGSTOWN and hot mills continue jammed. Production of car plates, shipbuilding plates and breakdowns have complicated matters for some plants and resulted in greatly extended hot strip order backlogs.

New sheet and strip business at PITTSBURGH so far this month has been running slightly ahead of a month ago and reflects a broad and well diversified demand. Forward buying continues on the part of most consumers and although pressure has been relaxed, demand for more prompt deliveries continues in many cases. Incoming specifications which include shipping releases against commitments as well as against fresh orders, are close to, and in some cases more than actual shipments leaving the mills.

Some CHICAGO mills report that first quarter rolling schedules are already practically filled, either by actual orders or by consumer commitments. Tonnage after Labor Day was received here in such volume that proper allocation was impossible. Tonnage

for first quarter, however, was allocated as soon as books were open for that period. Generally new sheet tonnage being received today is slightly under that of a few weeks ago although specifications against commitments have been so heavy as to make the actual tonnage booked about equal to shipments. Production is high at all CHICAGO district farm equipment and tractor plants. Labor trouble in Detroit has not affected Chicago mills seriously. Consumer pressure for deliveries has not lessened.

Mills in the SOUTHERN OHIO district are building fairly substantial backlogs into the first quarter. Current estimates indicate that bookings will carry mills through the month of January with a little spill over in February. Activity in the automotive industry has brought some emergency orders into the market and mills have exerted efforts to rearrange rolling schedules to accommodate this new demand. Forward buying, heretofore largely confined to the smaller users, is now coming from the large companies and adds a note of strength to the speculative purchasing for first quarter.

REINFORCING BARS

... Awards advance on Panama, Shasta projects

REINFORCING steel awards advanced to 11,450 tons from 9300 tons last week. The largest lettings are 3500 tons for the Panama Canal; 3230 tons for the Shasta Dam, Cal., Central Valley project, and 2000 tons for a housing project at South Boston.

New reinforcing steel projects at 14,825 tons are higher than a week ago and include 10,750 tons for outer work structures for a dam (bids due Dec. 15), near Denison, Tex., and 1500 tons at Harrison, N. J., for the Harrison Gardens housing project.

Carnegie-Illinois Steel Corp. and Bethlehem Steel Co. shared the Panama Canal tonnage approximating 3500 tons. New inquiries have slackened off some in the past few weeks but a substantial aggregate tonnage is moving into jobs involving less than 50 tons. One representative jobber recently found that by far the majority of his sales were going into projects requiring 40 tons or less of concrete bars, thus indicating demand emanating from repair and renovation of plants and buildings.

TUBULAR GOODS

DELIVERY promises of CLEVELAND sellers are well into December, but merchant pipe shipments are nearing normal and unless buying steps up will be back to normal in about two weeks. Production of some mills is complicated by the unavailability of raw steel.

Tubular sales at PITTSBURGH are changed but little from a week ago. Shipments continue heavy with capacity fairly well earmarked during the remainder of the year. All lines of activity are strong, including oil-country, standard pipe, and boiler tube demand.

WIRE PRODUCTS

... Orders above shipments at Cleveland; Output holds

ORDERS entered by CLEVELAND sellers have been above shipments recently. Production continues at close to the highest point in two years with drawing machinery hard pressed. Fears by customers of a possible shortage of wire rods have been eased and sufficient material is available for current operations of most users. Certain auto producers, however, have been pressing for quicker shipments from their parts makers, which is reflected in demands upon mills. Outlook for the first quarter continues bright.

Wire rod and manufacturers' wire specifications at PITTSBURGH are on a par with a week ago and in the past two weeks producers have made little if any headway in reducing their backlogs. A substantial portion of first quarter capacity is already used up. Merchant wire demand is steady and shipments remain at a high point.

CHICAGO sellers are finding some customers who ordered more than was

needed this year, and who are willing to allow mills to ship the excess to plants that are hard pressed for material. These cases are exceptional, of course, virtually nothing else being available this year. Leading sellers insist that little business is actually being entered on first quarter books and that until prices are announced, users are content with verbal assurances that their needs will be met.

RAILROAD BUYING

... Algoma Steel Corp. books 4000-ton rail order

IN addition to the 60,000 tons of rails purchased by New York Central lines and reported in THE IRON AGE last week, the system also placed 4000 tons with Algoma Steel Corp., Canada. A representative amount of track fastenings was ordered in addition to the 64,000 tons of rails.

New equipment purchases include one 660-hp. diesel-electric switcher for Tennessee Central from American Locomotive Co., one steam locomotive for Roberval & Saguenay from Canadian Locomotive Co., and 10 tank cars for Philadelphia Quartz Co. from American Car & Foundry Co. Pacific Fruit Express is planning to rebuild 2500 and repair an undetermined number of refrigerator cars in the first six months of 1940 at a cost of \$10,000,000.

The Seaboard Air Line has made application to the ICC for authority to sell \$2,250,000 in equipment trust certificates to the RFC to aid in financing the purchase of equipment costing \$2,529,546. The equipment includes 700 50-ton all steel box cars to be built by the Pullman Standard Car & Mfg. Co., 100 50-ton flat cars to be built by the American Car & Foundry Co. and

100 70-ton all steel hopper cars to be constructed by the Bethlehem Steel Co.

TIN PLATE

... Production 1 point to 97%

TIN plate operations are up one point this week to 97 per cent and minor fluctuations are anticipated in the remaining weeks of the year. Backlogs are still large and the volume of brand new business is about the same as a week ago. Consumers are beginning to focus their attention on the probability of first quarter price announcements and expect some information in the near future. It is by no means certain that there will be an increase in price, although such a move is a possibility.

IRON ORE

... Consumption in October highest since 1937

OCTOBER consumption of Lake Superior iron ore totaled 5,270,707 gross tons, highest since August, 1937, when 5,373,264 tons were consumed, according to the report of the Lake Superior Iron Ore Association, Cleveland. In September, 4,184,884 gross tons were consumed and in October, 1938, the figure was 2,780,585 tons. Cumulative total to Nov. 1 for the year 1939 is 33,344,946 tons against 19,512,277 for the 1937 period.

Iron ore on hand at furnaces Nov. 1 totaled 33,943,773 tons and at Lake Erie docks 5,120,884 tons, a total of 39,064,657 tons contrasted with 38,593,569 tons on Nov. 1, 1938. On Oct. 31 there were 154 furnaces in blast depending principally on Lake Superior iron ore against 137 on Sept. 30 and 88 on Oct. 31, 1938.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Nov. 21, 1939	Nov. 14, 1939	Oct. 24, 1939	Nov. 22, 1938	1939	1938
Fabricated structural steel awards	9,000	14,850	21,800	16,000	875,025	803,550
Fabricated plate awards	575	150	160	1,140	175,040	119,075
Steel sheet piling awards	0	1,500	110	890	74,565	42,915
Reinforcing bar awards	11,450	9,300	5,155	3,200	433,415	307,100
Total Letting of Construction Steel..	21,025	25,800	27,225	21,230	1,558,045	1,272,640

400 Hear Production Problems Discussed at A.M.A. Meeting

CHICAGO—More than 400 executives attended a production conference of the American Management Association, held last week in Chicago, and listened to expert discussions of varied production problems and factors influencing production.

The vice president of the association's production division, Raymond S. Perry, vice president, Ingersoll Milling Machine Co., Rockford, opened the conference with his comments on expansion problems. Mr. Perry emphasized that expansion does not necessarily mean new facilities. Greater output can be obtained, he said, in four ways; hiring more men, adding production facilities, increasing productive equipment in bottleneck departments only, and a general plant expansion.

Mr. Perry stated that in his belief the current export stimulus at some American plants is temporary and may disappear at any moment, and that no domestic business is in sight which would maintain present operations should this foreign demand suddenly cease. One worthwhile result of this activity, however, according to Mr. Perry, is that industries can take advantage of their high operating rates and because of greater unit profit resulting from increased volume, improve plant facilities, many of which are over 25 years old.

Automobile Men Pioneered

A paper prepared by Albert Kahn, and read by Louis Kahn, both of Albert Kahn, Inc., Detroit, said that the modern efficient industrial plant structure owes much to pioneering on the part of the automobile industry. A well designed plant is one into which raw materials enter at one point and pass in an orderly manner through production departments to emerge at the end, finished ready for shipping.

It was Henry Ford, Mr. Kahn said, who first insisted on all production departments being under one roof with no dividing lines, and who also decided from his own experience with multi-story factory buildings, that one-floor plants were more economical.

The publicity and advertising alone which follow the building of a modern plant is oftentimes worth the construction cost. The external attractiveness of a plant is of great importance, Mr.

Kahn feels, in creating desirable opinion in the community, and good will and pride among the employees.

The arrangement of machines and plant equipment so as to improve the orderly flow of production through a plant is the most important single factor in the lowering of production costs by plant engineering, according to H. K. Ferguson, president, H. K. Ferguson Co., Cleveland. After this has been done, said Mr. Ferguson, the building problem is simple.

Operation of a new plant is affected by factors which should be carefully considered at the outset, Mr. Ferguson said, these being, maintenance, employee efficiency and operation of building services. Maintenance expense in general will decrease as the quality of the building increases, and Mr. Ferguson called it poor economy to go beyond a point where quality results in a minimum of maintenance expense.

Employee efficiency aims at decreasing physical and mental fatigue thereby raising production and cutting down mistakes and accidents. Ex-

pensive air conditioning and lighting are foolish, in Mr. Ferguson's opinion, in plants where quantity and quality of product depend more on equipment than on the human element. Where human skill is the dominant influence, however, working conditions should approach the ideal, he said.

Of extreme interest was the story behind the designing of a prominent "plant of tomorrow," that of the Simonds Saw & Steel Co., Fitchburg, Mass., by W. J. Austin, president, the Austin Co., Detroit. Mr. Austin told how the Simonds management turned their backs on established plant construction practices, and started from scratch, their main idea being to obtain a plant where human engineering was a main consideration.

At the dinner-smoker Wednesday night, Harold V. Coes, Ford, Bacon & Davis, Inc., New York, said that this country without doubt is experiencing business improvement traceable to "a healthy recovery movement since only a fraction of the total production is, as yet, intended for the belligerents." In addition, business may be further improved, in Mr. Coes' opinion, by European war orders, our own rearmament, and trade from foreign countries whose former suppliers can no longer take care of them.

Vogt, U. S. Steel Corp. Comptroller, Dies

ADOLPH W. VOGT, comptroller of the United States Steel Corp. of New Jersey, and widely known for his distinguished record in the field of cost accounting, died suddenly Monday of a heart attack while returning to his home in Montclair, N. J. from New York. Mr. Vogt had been ill during the summer but had



ADOLPH W. VOGT

recovered sufficiently to spend part of his time in the office.

Mr. Vogt was one of the few remaining officials of the United States Steel Corp. who was with the organization at its formation in 1901. He began his business career in 1894 with the Illinois Steel Co., one of the companies that became a part of the United States Steel Corp. In 1901 he became chief statistician of the Steel corporation, and was appointed assistant comptroller in 1915. In 1936 he was made comptroller. Mr. Vogt was born in Wurttemberg, Germany, Jan. 11, 1879. He was educated in the public schools of Chicago. Funeral services will be held Friday at 3 p. m. at St. Luke's Episcopal Church, Montclair, N. J.

Cleveland Punch & Shear Erects Plant Addition

CLEVELAND—Construction of a new addition to the plant of the Cleveland Punch & Shear Works Co. will start soon and be ready for use in February, according to W. D. Sayle, president. The building and new equipment will cost around \$285,000.

Government Steel Orders

WASHINGTON — Government contracts for iron and steel products, as reported for the week ended Nov. 11 by the Labor Department's public contracts division, totaled \$765,305. Also reported for the same period were contracts for non-ferrous metals and alloys amounting to \$153,800; and for machinery, \$404,642. Details follow:

Iron and Steel Products

The National Screw & Mfg. Co., Cleveland, War Air Corps, nuts.	\$9,734.12
Widim Metal Goods Co., Garwood, N. J., Navy S&A, machine	60,427.20
The Greene-Wolf Co., Inc., Brooklyn, N. Y., Panama Canal, pipe, steel welded	16,392.90
Crane-O'Fallon Co., Denver, Interior, piping	36,735.00
The Armo International Corp., War Q M C, steel pipe	11,760.96
Clayton Mark & Co., Evanston, Ill., Interior, steel tubing	28,703.00
Allegheny Ludlum Steel Corp., Watervliet, N. Y., War Ordnance, steel rod	40,625.00
Bethlehem Steel Co., Bethlehem, Pa., War Ordnance, steel rod	30,960.00
The Carpenter Steel Co., Reading, Pa., War Ordnance, steel rod	41,140.00
Universal-Cyclops Steel Corp., Bridgeville, Pa., War Ordnance, steel rod	51,145.00
Bethlehem Steel Co., San Francisco, Navy Purch. Office, bar steel	11,697.54
The Patent Scaffolding Co., Inc., Philadelphia, Navy Marine Corps, observation towers	11,419.20
Bethlehem Steel Co., Bethlehem, Pa., WPA, steel sheet piling	11,478.07
Keystone Steel & Wire Co., Peoria, Ill., Panama Canal, cloth, steel wire	11,788.60
Bethlehem Steel Co., Bethlehem, Pa., and Sparrows Point, Md., War Engineer Office, steel wire strand	22,372.50
Copperweld Steel Co., Glassport, Pa., War Engineer Office, wires	15,663.30
Southern Pacific Co., San Francisco, Interior, relay rails	78,296.35
Metal & Thermit Corp., N. Y. C., Norfolk Navy Yd., labor and material for welded joints	13,135.00
American Welding Co., New York City, and Carbondale, Pa., War CWS, steel chemical containers	27,924.00
National Tube Co., Pittsburgh, Navy Purch. Office, flasks, air accumulator	10,094.50
Steel & Tubes Division Republic Steel Corp., Cleveland, War Ordnance, burster casing assemblies	197,105.52
New York Engineering Co., New York City, Panama Canal, material for locking devices	15,152.02
J. M. Tull Metal & Supply Co., Inc., Atlanta, Bethlehem Steel Co., Bethlehem, Pa., TVA, drill steel	11,556.11

Non-Ferrous Metals and Alloys

Chase Brass & Copper Co., Inc., Waterbury, Conn., War Ordnance, cartridge cups	\$27,690.00
U. S. Steel Export Co., Panama Canal, copper wire	18,515.56
General Electric Co., Schenectady, Norfolk Navy Yd., copper cable	14,219.81
E. A. Laboratories, Inc., Brooklyn, N. Y., War CWS, angletubes	13,680.00
A. L. Cahn & Sons, Inc., New York City, Procurement, baking and roasting pans	Indefinite
Revere Copper & Brass, Inc., Baltimore, War Ordnance, gilding metal	58,110.00
Chase Brass & Copper Co., Inc., Waterbury, Conn., Navy Purch. Office, copper-nickel-alloy tubing	11,504.88
Manning, Bowman & Co., Meriden, Conn., Procurement, water service sets	Indefinite
Wilbur B. Driver Co., Newark, N. J., Navy Purch. Office, nickel-chromium-alloy	10,080.00

Machinery

The Caterpillar Tractor Co., Peoria, Ill., Naval Air Station, tractors	\$13,340.72
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Rockford Machine Tool Co., Rockford, Ill., Navy S & A, planer	23,643.00
Swind Machinery Co., Philadelphia, Navy S & A, machines, milling and drilling	30,258.00
Consolidated Machine Tool Corp., Rochester, N. Y., Navy S & A, machine, planing and scarfing	43,460.00
Jones & Lamson Machine Co., Springfield, Vt., War Ordnance, machine, spindle	15,397.00
Federal Machinery Sales Co., Chicago; War Ordnance, inclinable presses	12,978.00
The American Toolworks Co., Cincinnati, Navy S & A, lathes	15,048.00
Kearney & Trecker Corp., Milwaukee, War Ordnance, milling machines	34,724.60
The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, Navy S & A, press, heading	51,929.00
The E. L. Essley Machinery Co., Chicago, War Ordnance, drill & drilling and tapping machines	34,381.00
Marshall & Huschart Machinery Co., Chicago, War Ordnance, press and boring mill	29,862.00
Chambersburg Engineering Co., Chambersburg, Pa., War Ordnance, drop hammer	14,080.00
Erie Foundry Co., Erie, Pa., War Ordnance, drop hammers	33,470.00
Dexter Folder Co., Pearl River, N. Y., G P O, steam feeders	13,416.00
Bay City Shovels, Inc., Bay City, Mich., Navy S & A, crane	13,500.00
Wright Mfg. Division of American Chain & Cable Co., Inc., York, Pa., TVA, overhead trolleys	14,155.00
Bay City Shovels, Inc., Bay City, Mich., Navy S & A, crane	11,000.00

CAST IRON PIPE

Lynnfield, Mass., has engaged Whitman & Howard, engineers, 39 Broad Street, Boston, to make plans for a water system, including mains, pumping station, standpipe, etc. C. A. Studley and E. A. Smith, selectmen, are in charge.

Stillwater, Okla., plans pipe line extensions and replacements in water system. Cost about \$121,000 with other waterworks installation. A bond issue of \$458,000 is being arranged for this and other municipal work.

Little Rock, Ark., plans pipe line from North Little Rock station to Camp Joe T. Robinson, for water supply at latter place. Cost about \$175,000.

Houma, La., asks bids until Dec. 5 for pipe line extensions in water system; also for new 150,000-gal. elevated steel tank and tower, and extensions and improvements in filtration plant, etc. T. Baker Smith is city engineer.

Public Works Officer, Naval Air Station, Pensacola, Fla., closes bids Dec. 13 for water distribution system, including pipe lines, pumps, concrete storage reservoir, etc. (Specifications 9469).

City Water Department, Oklahoma City, Okla., M. B. Cunningham, water superintendent is considering recommendations of special committee for extensions and improvements in water system including development of new source of supply. Total cost estimated at \$6,900,000, of which about \$1,162,000 will be used for extensions and replacements in pipe lines. O. N. Floyd, Burt Building, Dallas, Tex., consulting engineer, made surveys and estimates of cost.

Bremerton, Wash., plans pipe line extensions and replacements in water system. Appropriation of about \$350,000 is being arranged for this and other waterworks installation, of which approximately \$150,000 will represent Federal aid.

Santa Rosa, Cal., plans about 30,000 ft. of 6, 8 and 12-in. pipe for main water lines; also new 1,000,000-gal. water pressure reservoir and other waterworks installation. Bond issue of \$190,000 has been authorized for project.

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 29 for 21,500 ft. of 12-in. inside diameter, cement-lined, cast iron water pipe; also for tees,

couplings, gate valves, etc. (Schedule 3748); until Nov. 27 for four cast iron pipe bends (Schedule 3742).

Council Grove, Kan., closes bids Nov. 25 for main pipe line for connection with filtration plant; also for construction of dam at water supply source. Cost about \$210,000. S. A. Sulentic, New England Building, Topeka, Kan., is consulting engineer.

San Francisco has awarded 715 tons of 3, 6, and 8-in. pipe as follows: 370 tons of 3 and 6-in. to Central Foundry Co., San Francisco, and 345 tons of 8-in. to United States Cast Iron Pipe & Foundry Co., San Francisco.

... PIPE LINES ...

West Michigan Consumers Co., Muskegon, Mich., plans new 8-in. welded steel pipe line from oil and gas field in Kent County to Ravenna, Mich., about 20 miles, for natural gas transmission. Connection will be made with main system of company at latter place. Cost close to \$100,000.

Valley Pipe Line Co., Alamo National Bank Building, San Antonio, Tex., has authorized welded steel pipe line gathering system in oil field districts of Hidalgo and Starr Counties, Tex., including connection with main pipe line of company, for crude oil transmission, totaling about 50 miles of 4 and 5½-in. pipe. Company also plans new 6-in. line, using welded joint pressure cast iron pipe, from pumping station in Ricaby oil field, Starr County, to point near Falfurrias, Brooks County, about 45 miles, for similar oil transmission. Work will be carried out by company forces. Frank T. Murchison is president.

Niagara Brine Co., Inc., care of Ford, Bacon & Davis, Inc., 39 Broadway, New York, consulting engineer, has been organized by chemical interests at Niagara Falls, N. Y., to build a pipe line for brine transmission from point near Linden, Genesee County, N. Y., to Niagara Falls, close to 60 miles, for distribution to chemical plants at latter place, where brine will be sold as raw material for production of caustic soda, chlorine and allied alkali products. Projects will include formation of a 375-acre lake of continuous salt brine at Linden, developed from salt deposits by means of hydraulic pumps, comprising source of supply; salt-purifying plant, water reservoir and auxiliary structures. Pipe line will operate under pressure, with booster stations along route, and will be formed of special metal pipe to resist brine action. Work is scheduled to begin early in 1940. Cost close to \$1,500,000. Niagara Alkali Co., Buffalo Avenue, Niagara Falls, is one of companies interested in project, which will be carried out under direction of engineer noted.

Mississippi River Commission, Vicksburg, Miss., closes bids Nov. 28 for 14,000 ft. of welded steel pipe; also for bushings, elbows, nipples, unions, tees, reducers, caps and gate valves (Circular 29).

Gulf Oil Corp., Gulf Building, Pittsburgh, has awarded contract to National Tube Co., Pittsburgh, for about 25,000 tons of 8½-in. and 6½-in. steel pipe, bulk of order for larger size, for new welded steel pipe line from Port St. Joe, Fla., to Atlanta, Ga., passing through part of Alabama, about 450 miles of pipe, for gasoline transmission, recently noted in these columns. Cost close to \$2,500,000.

Pell City, Ala., plans steel pipe lines for municipal natural gas distribution system, including welded steel pipe line for connection with supply source, a few miles from municipality; also a control station and other operating facilities. J. W. Goodwin is city engineer.

Burbank, Cal., has taken bids on about 17,000 ft. of 24-in. cast iron, steel, or concrete pipe; 430 ft. of 30-in. cast iron or steel pipe; and 5000 ft. of 6-in. cast iron pipe.

FABRICATED STEEL

... Lettings decline to 9000 tons from 14,850 tons last week
 ... New projects slightly higher at 18,000 tons as against
 16,900 tons in the previous week ... Plate awards only
 575 tons.

NORTH ATLANTIC STATES AWARDS

- 1600 Tons, Washington, central office building for Navy Department, to Lehigh Structural Steel Co., Allentown, Pa.
- 700 Tons, Charlestown, Mass., Navy Yard machine shop extension, to Lehigh Structural Steel Co., Boston.
- 615 Tons, Long Island City, N. Y., warehouse block No. 11 for National Sugar Refining Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 300 Tons, Rochester, N. Y., steam turbine plant for Rochester Gas & Electric Co., to Leach Steel Corp., Rochester.
- 270 Tons, Long Island City, N. Y., extension to building D for Pepsi Cola Co., to American Bridge Co., Pittsburgh.
- 225 Tons, Philadelphia, building for Resinous Products & Chemical Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 220 Tons, Homestead, Pa., forge shop addition for Mesta Machine Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 210 Tons, Marcus Hook, Pa., Catalytic Development Co. building, to Belmont Iron Works, Philadelphia.
- 190 Tons, Marion, N. J., turbine supports for Public Service Electric & Gas Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 170 Tons, Bridgeport, Conn., coal conveyor for United Illuminating Co., to New England Iron Works, New Haven, Conn.
- 170 Tons, Edgewater, N. J., warehouse for Hill Bros. Coffee, Inc., to an unnamed fabricator.
- 105 Tons, Laurel, Md., storehouses, to Dietrich Brothers, Baltimore.
- 100 Tons, Rochester, N. Y., factory addition for Rochester Envelope Co., to F. L. Hughes & Co., Rochester.
- 100 Tons, Buffalo, Canterbury apartments, to R. S. McMannus Steel Construction Co., Buffalo.

SOUTH AND SOUTHWEST

- 565 Tons, Port Arthur, Tex., machine shop for Texas Co., to Petroleum Iron Works Co., Beaumont, Tex.
- 270 Tons, Quantico, Va., auditorium, to Fort Pitt Bridge Works Co., Pittsburgh.
- 250 Tons, Beaver Dam, Ky., State beam spans, to Bethlehem Steel Co., Bethlehem, Pa.
- 150 Tons, Galisteo, N. M., State bridge SAP-207-B, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

CENTRAL STATES

- 735 Tons, Omaha, Neb., L Street viaduct, to Paxton & Vierling Iron Works, Omaha.
- 600 Tons, Cedar Rapids, Iowa, boiler house, Iowa Light & Power Co., to Iowa Steel & Iron Works, Cedar Rapids.
- 250 Tons, Robbinsdale, Minn., State bridge No. 5523, to Bethlehem Steel Co., Bethlehem, Pa.
- 210 Tons, Chicago, alterations, 310 South Michigan Building, to Vierling Steel Works, Chicago.
- 190 Tons, Riverside, Ill., extension to building No. 8, Acme Steel Co., to Joseph T. Ryerson & Son, Inc., Chicago.
- 150 Tons, Jefferson County, Wis., bridge, to American Bridge Co., Pittsburgh.
- 120 Tons, Cincinnati, office building addition for Union Central Life Insurance Co., to Ingalls Iron Works Co., Birmingham.
- 120 Tons, Cleveland, building for Producers Milk Co., to Fort Pitt Bridge Works Co., Pittsburgh.
- 105 Tons, Racine County, Wis., bridge, to Wisconsin Bridge Co., Milwaukee.
- 105 Tons, Benton County, Iowa, beam span, to Clinton Bridge Works, Clinton, Iowa.
- 105 Tons, Ida County, beam span, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
- 100 Tons, Duluth, Minn., sewage plant, to American Bridge Co., Pittsburgh.

PENDING STRUCTURAL PROJECTS NORTH ATLANTIC STATES

- 275 Tons, Brooklyn, station addition, for Brooklyn Edison Co.
- 200 Tons, Mt. Lebanon, Pa., apartment house for Coste Bros.
- 160 Tons, Philadelphia, addition to Henry Disston & Sons, Inc.
- 125 Tons, Brooklyn, overpass MS-39.16.

THE SOUTH

- 250 Tons, Cleveland, Fla., Shell Creek State bridges.

CENTRAL STATES

- 2600 Tons, State of Illinois, six bridges; bids Dec. 5 at Springfield.
- 550 Tons, Toledo, Ohio, pumping station and filtration plant; bids in December.
- 350 Tons, Chicago, alterations to building for Straus Building Corp.
- 225 Tons, Brown County, Ohio, State project in village of Ripley; bids Nov. 28.

REINFORCING STEEL

... Awards of 11,450 tons; 14,810 tons in new projects.

ATLANTIC STATES AWARDS

- 2000 Tons, South Boston, housing project, to Truscon Steel Co., Boston; John Bowen Co., Boston, contractor.
- 800 Tons, Roxbury, Mass., housing project, to Joseph T. Ryerson & Son, Inc., Cambridge, Mass.; C. J. Maney Co., Somerville, Mass., contractor.
- 300 Tons, Washington, Freedman's Hospital, to Bethlehem Steel Co., Bethlehem, Pa., through George A. Fuller Co., contractor.
- 300 Tons, New York, 11th Avenue viaduct over N. Y. Central tracks, to Seaboard Steel Products Co., New York.
- 116 Tons, New Hartford, Conn., State road, to an unnamed bidder; New Haven Road Construction Co., New Haven, Conn., contractor.

CANAL ZONE

- 3500 Tons, Panama Canal schedule, divided about evenly between Carnegie-Illinois Steel Corp., Pittsburgh, and Bethlehem Steel Co., Bethlehem, Pa.

SOUTH AND CENTRAL

- 255 Tons, Rutledge, Tex., Marshall Ford Dam (Invitation A-46807-A), to Sheffield Steel Co., Kansas City, Mo.
- 200 Tons, Topeka, Kan., Morrell Packing Co. plant, to Sheffield Steel Corp., Kansas City, Mo., through Pittsburgh-Des Moines Steel Co.
- 130 Tons, Chicago, superstructure, S. Western Avenue viaduct, to Bethlehem Steel Co., Chicago, through J. McGarry Co., contractor.
- 100 Tons, Portsmouth, Va., sub-assembly shop, to Bethlehem Steel Co., Bethlehem, Pa., through Virginia Steel Co.; Ralph Herzog, contractor.
- 100 Tons, Muncie, Ind., Middletown Gardens housing, to Truscon Steel Co., Youngstown, through J. B. Snyder & Sons.
- 110 Tons, Chicago, Commonwealth Edison Fisk Street station, to Truscon Steel Co., Youngstown.

WESTERN STATES

- 4500 Tons, San Francisco, Federal appraisers' stores and immigration building; bids Dec. 6.
- 3400 Tons, Los Angeles, bearing piles for Sepulveda Dam; bids Dec. 14.
- 3000 Tons, Hickam Field, T. H., engineering shop; bids Nov. 28.
- 2800 Tons, San Diego, Cal., Consolidated Aircraft plant; revised tonnage.
- 1664 Tons, Antler, Cal., Sacramento River bridge; bids postponed until Dec. 6.
- 1285 Tons, Los Angeles, First and Beverly Streets grade separation; news bids Nov. 29. Previously reported awarded to Consolidated Steel Corp., Los Angeles, low bidder on rejected bid call.
- 650 Tons, Tongue Point, Ore., storehouse, shop building, etc., for Naval Air Station.
- 150 Tons, Mare Island, Cal., beams for Navy Yard (Schedule 7739); bids in.
- 120 Tons, Coram, Cal., stop log guides, Specification 1303-D, for Bureau of Reclamation.

FABRICATED PLATES AWARDS

- 375 Tons, Avon, Cal., stacks for Pacific Gas & Electric Co., to Western Pipe & Steel Co., San Francisco.
- 260 Tons, Memphis, Tenn., snagboat for U. S. Engineer's Office, to Bethlehem Steel Co., Bethlehem, Pa.

PENDING PROJECTS

- 490 Tons, gates for outer works structures of dam near Denison, Tex.; bids Dec. 15.
- 150 Tons, Watts Bar Dam, Tenn., rolled steel armor for lock, TVA project.

SHEET PILING

PENDING PROJECTS

- 10,000 Tons, Pearl Harbor, T. H., graving docks (Specification 9100); bids Dec. 20. Tonnage includes H-type bearing piles.
- 2900 Tons, Los Angeles, Sepulveda Dam; bids Dec. 14.

WESTERN STATES

- 3230 Tons, Shasta Dam, Cal., Central Valley project, to Bethlehem Steel Co., San Francisco.
- 288 Tons, San Francisco, Alcatraz Island housing group, to Truscon Steel Co., San Francisco, through Louis C. Dunn, San Francisco, contractor.

PENDING REINFORCING BAR PROJECTS ATLANTIC STATES

- 1500 Tons, Harrison, N. J., Harrison Gardens housing project.
- 500 Tons, Philadelphia, Navy yard research laboratory, Ralph S. Herzog, Philadelphia, low bidder (previously reported).
- 250 Tons, Aberdeen, Md., Ballistic Research laboratory; Ralph S. Herzog, contractor.
- 188 Tons, Westmoreland County, Pa., Laurel Hill ventilation buildings; Navarro Corp., low bidder.
- 177 Tons, Fulton County, Pa., Sideling Hill ventilation buildings; Capitol Construction Co., low bidder.
- 150 Tons, West Haven, Conn., Armstrong Rubber Co. plant.

SOUTH AND CENTRAL

- 10,750 Tons, outer work structures of dam near Denison, Tex.; bids Dec. 15.
- 550 Tons, Williamsburg, Va., tunnel.
- 500 Tons, Chicago, section D6B, subway, bids extended to Dec. 7 from Nov. 22.
- 350 Tons, Chicago, section S9C, subway; bids Dec. 14.
- 260 Tons, Milwaukee, Wisconsin cold storage plant.
- 130 Tons, Detroit, Engineers' Club building.
- 115 Tons, Washington County, Ohio, bridge in Marion and Warren townships; L. T. Sisler & Son & Marion Sisler, Marietta, Ohio, low bidders (previously reported).
- 100 Tons, Medina and Summit Counties, Ohio, State project No. 246; A. J. Baltes, Norwalk, low bidder on part one; O. H. Ringwald & Sons, Chillicothe, low bidder on part two (previously reported).

WESTERN STATES

- 3250 Tons, Los Angeles, Sepulveda Dam; bids Dec. 14 (previously reported).
- 635 Tons, Antler, Cal., Sacramento River bridge; bids postponed until Dec. 6.
- 103 Tons, Los Angeles, grade separation, First and Beverly Streets; new bids Nov. 29.

... NON-FERROUS ...

... *Buying is at a moderate pace, but shipments are maintained at high level . . . October lead shipments of 66,000 tons reduce stocks to 74,000 tons . . . Export copper demand fairly active at 13.10c. to 13.20c., f.a.s.*

NEW YORK, Nov. 21—Lacking important changes in the foreign situation, the chief interest in the trade here in the past week was the question of how long the present accelerated rate of shipments will be maintained. Copper fabricators are known to be booked almost to capacity over the next several months. Higher automobile production, heavy government buying and the sustained high rate of galvanizing operations all appear to point to heavy

shipments of most non-ferrous metals over the next several months at least. The trend beyond the point will be controlled in a large measure by the turn of events in the European war. Trade estimates put October copper shipments at around 85,000 tons, which would be under the 105,000-ton peak of April, 1937, but substantially above that year's average. Considerable difficulty still exists in obtaining spot copper. Resale factors have some limited quantities available at from

13c. to 13.25c. per lb., Connecticut Valley. Primary interests, however, are practically out of the nearby market and their unchanged quotation of 12.50c. per lb., is essentially nominal in so far as nearby shipment is concerned. Export demand was more active this past week with a number of Continental consumers active, and some business was done during the week at prices ranging between 13.10c. and 13.20c. per lb., f.a.s.

Zinc

Prime Western demand was off somewhat in the past week, but shipments were slightly higher. Sales in the period were around 3000 tons, as against 4100 in the preceding week, and deliveries totaled about 7500 tons as against 6400 tons. In view of the comparatively well covered position of most consumers and the heavy shipping activity, the lower sales had no observable effect on prices. Brass and bronze ingot deliveries in October were 8993 tons. Prime Western quotations are unchanged at 6.89c. per lb., New York.

Lead

Buying in the past week was on a parity with the preceding week, with sales closely matching intake. Chief demand centers on December, with that month estimated at between 45 and 50 per cent covered. Quotations are unchanged at 5.50c. per lb., New York. Optimistic estimates of October activity were confirmed Tuesday with the release of the month's statistics. These showed shipments of 66,000 tons, a figure far in excess of any monthly figure of 1937, and a drop of close to 24,000 tons in stocks. This decline left reserves at the end of the month at 74,000 tons, or 16,000 tons below the lowest point reached in 1937.

Tin

There has been no improvement in the meager offerings of the Far Eastern producers, with the consequence that offerings here have gradually dried up in the face of a very active domestic demand. Most consumers are fairly well covered on this quarter's needs, but importers' inability to obtain metal from the East is causing growing concern over the first quarter's needs. Sellers are unable to accommodate this demand as long as the deadlock in the East exists. The spread between spot and futures has been reduced from about 4.25c. a week ago to 2.50c. today. In the absence of trading, quoted prices are still strictly nominal.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Nov. 15	Nov. 16	Nov. 17	Nov. 20	Nov. 21
Copper, Electrolytic ¹	12.50	12.50	12.50	12.50	12.50
Copper, Lake	12.50	12.50	12.50	12.50	12.50
Tin, Straits, New York	51.00	51.00	51.00	51.50	52.00
Zinc, East St. Louis ²	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis ³	5.35	5.35	5.35	5.35	5.35

¹ Delivered Conn. Valley. Deduct ¼c. for New York delivery. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	53.00c. Nominal	
Copper, Lake	13.75c. Nominal	
Copper, electro	14.00c. Nominal	
Copper, castings	13.625c. Nominal	
*Copper sheets, hot-rolled	20.87c.	20.87c.
*Yellow brass sheets ..	19.06c.	19.06c.
*Seamless brass tubes ..	21.81c.	21.81c.
*Seamless copper tubes ..	21.37c.	21.37c.
*Yellow brass rods	15.23c.	15.23c.
Zinc slabs	7.875c.	8.125c.
Zinc sheets, No. 9 casks	12.00c.	12.10c.
Lead, American pig ...	6.50c.	6.125c.
Lead, bar	8.95c.	8.75c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ½	32.25c. Nominal	
Babbitt metal, commercial grade	Nominal	Nominal

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33½; on brass sheets and rods, 40; on brass tubes, 33½, and copper tubes, 40.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible...	10.25c.	10.875c.
Copper, hvy. and wire...	9.25c.	9.625c.
Copper, light and bottoms	8.25c.	8.75c.
Brass, heavy	5.50c.	6.00c.
Brass, light	4.625c.	5.375c.
Hvy. machine composition	9.25c.	10.125c.
No. 1 yel. brass turnings	5.25c.	5.75c.
No. 1 red brass or comp. turnings	9.125c.	9.625c.
Lead, heavy	4.50c.	4.875c.
Cast aluminum	9.25c.	10.25c.
Sheet aluminum	15.25c.	16.25c.
Zinc	3.625c.	4.875c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$135-\$137 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.75c. a lb.

IRON AND STEEL SCRAP

... Composite declines 25c. to \$19.58, reflecting continued softness ... Mill buying still light.

NOV. 21—Sales are light and the market is soft in most districts. At Buffalo, where the only mill sales of any size are reported, the market fell off \$1 on the basis of these transactions. Small sales at Pittsburgh have likewise depressed prices there but to a lesser extent, No. 1 steel being quoted down 50c. this week. A mill sale at Chicago has forced prices down there 25c. on No. 1 and 50c. on many other items on the list. Eastern Pennsylvania prices are nominally unchanged in the absence of test. As a result of these changes, the composite price of No. 1 steel has declined 25c. to \$19.58. Except for a slight upturn on Oct. 31, the trend in scrap prices has been downward since Oct. 3, when the high point of the year at \$22.50 was reached. The present figure is \$2.92 below that, or 13 per cent. The current domestic market softness is attributed to general lack of mill buying, and an upturn is looked for when present commitments near the end.

Newspaper reports of British scrap orders totaling 750,000 tons have been greatly exaggerated, according to the principal sellers. Representing largely adjustments on old contracts made last June, the tonnage recently taken will be billed on a sliding scale which ties in with THE IRON AGE composite price for No. 1 steel. Export dealer buying prices are considerably softer this week, not only in keeping with the domestic trend, but also because of the continued restrictions on the supply of vessels.

Pittsburgh

The market continues soft and thin. Three major factors which may have contributed to recent softness are: consumers bought heavily in September and October with deliveries now reaching them freely, the high prices existent a month or two ago apparently started the movement of scrap from distant points, and some scrap consumers are following a general rule to keep inventories down until after the end of the year. One factor which may preclude much further sliding off in scrap prices is the reported purchase of substantial tonnages of scrap by England. No. 1 steel has been offered to consumers here at \$21 a ton. Meanwhile, there are little or no transactions taking place at the present time. No. 1 steel is quoted this week at \$20.50 to \$21, down 50c. a ton from last week, with corresponding reductions in other grades.

Chicago

The decline in the Chicago market continues, a mill sale last week at \$17.50 establishing a price of heavy melting steel at \$17 to \$17.50. Brokers are able to buy from dealers at \$17 and \$17.25, the former figure to date not bringing out a great deal of material. The entire market is softer in sympathy with heavy melting steel. Brokers expect prices to level off around today's quotation. Shipments, they say, are considerably less in volume than a few weeks ago. The leading mill buyer, however, is understood to have a sizable scrap pile on the ground and a large tonnage on order. Two railroad lists, the Burlington and the Rock Island, are closing this week.

Philadelphia

Despite the high rate of consumption in this district, the undertone of the market here is still on the soft side. Quotations are nominally unchanged in the absence of new mill sales, but it is quite probable that new commitments could be obtained at at least 50c. below the present range of prices. Material continues to flow out in ample quantity, although a prolonged cold spell or a sudden price movement might disrupt this flow to the extent of seriously hampering operations. Restrictions continue at two mills. There has been some recent broker buying at \$19.50 for No. 1. The boat expected here on the 15th to load for Japan will not arrive until the 25th. Meanwhile, a small amount of export buying is being done at \$19.25 to \$19.50 for No. 1 and \$18 to \$18.25 for No. 2.

Youngstown

Prices here are nominal and possibly a little weaker. Sentiment has weakened due to the caution displayed by mill buyers, despite the fact their open hearths are eating up scrap furiously and their yard piles are not too large.

Cleveland

After a one-week rise occasioned by a mill sale, scrap has sagged back to its level of two weeks ago, with No. 1 heavy melting quoted at \$19 to \$19.50. Apparently this dip is caused by material being freer and the lack of fresh mill sales, plus vessel shipments though the latter are at a reduced rate.

Buffalo

The market fell off approximately \$1 a ton this week when business was placed with local dealers at lower than quoted figures. Two sales totaling something over 5000 tons were made to the largest consumer in the district on a basis of \$19.50 to \$20 for No. 1 heavy melting steel. Practically the entire list was affected.

St. Louis

The market for scrap iron is a bit softer this week, and some prices are

down. This condition is in sympathy with lower prices prevailing in the East, a disposition by consumers not to increase their inventories and a heavier movement of materials from the country as a result of open weather. Railroad lists: Chicago, Rock Island & Pacific, 2600 tons; Gulf Coast Lines, 600 tons; Chicago, Milwaukee, St. Paul & Pacific, 400 tons.

Cincinnati

The district scrap market is quiet. Mills are apparently reluctant to make any commitments for old materials and dealers show no disposition to press for sales because of the present price situation. Currently, bids on steel grades are down another 50c. but cast grades are still on the same level as a week ago. Some small trading is reported among the dealers.

Detroit

The softness prevailing in scrap has caused a downward movement of 50c. in all items in the Detroit market area, with substantially greater softness indicated for blast furnace scrap and foundry materials. Production foundries particularly are feeling the effects from the Chrysler strike and demand for scrap from these consumers has disappeared. Automotive bundles are understood to have sold at \$17 Tuesday, thus effecting a reduction of \$1 on this item as well as sheet clippings.

New York

Contracts for moderate tonnages of scrap have been placed by the British in the last week or so at a price tied in with THE IRON AGE composite price for No. 1 steel, with the usual spread downward for No. 2 and cast items. These orders, received by the principal brokers, represent in the main adjustments on old contracts made in May and June when war conditions and their effect upon prices were unforeseen. The present arrangement sets a sliding scale of prices which will reflect domestic market conditions from week to week. There has also been a relatively small amount of Italian buying on the same basis. Meanwhile, in line with the trend in domestic prices, broker buying prices have been lowered for material delivered to barges, anywhere from 50c. to \$2 a ton. One broker has large stocks on barges but lacks vessels in which to ship and hence is quoting the lower end of the published range. Prices for domestic material on cars are also weaker.

Boston

Prices on domestic delivered material are 25c. to \$1 a ton lower, while the export market is off 50c. Buying for domestic delivery has come almost to a standstill. The boat supply situation under the present British convoy system is quite unsatisfactory to exporters, who never know when a boat is available until it arrives. Exporters, therefore, cannot anticipate requirements with any degree of safety from demurrage and storage charges. Exporters have standing orders for Japan, but no boats. However, a boat is finishing loading here for England, and another at Portland, Me., the latter taking 7500 tons partly loaded at Providence. A boat has left here with 7000 tons for Spain.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$20.50 to \$21.00
Railroad heavy melting	21.50 to 22.00
No. 2 heavy melting	18.50 to 19.00
Scrap rails	22.50 to 23.00
Rails 3 ft. and under	23.50 to 24.00
Comp. sheet steel	20.50 to 21.00
Hand bundled sheets	19.50 to 20.00
Heavy steel axle turn.	18.50 to 19.00
Machine shop turnings	14.00 to 14.50
Short shov. turnings	15.50 to 16.00
Mixed bor. & turn.	13.00 to 13.50
Cast iron borings	13.00 to 13.50
Cast iron carwheels	20.50 to 21.00
Heavy breakable cast.	17.00 to 17.50
No. 1 cupola cast	20.50 to 21.00
RR. knuckles & coup.	25.00 to 26.00
Rail coil springs	25.00 to 26.00
Rail leaf springs	25.00 to 26.00
Rolled steel wheels	25.00 to 26.00
Low phos. billet crops	26.00 to 27.00
Low phos. punchings	24.50 to 25.00
Low phos. heavy plate	25.00 to 25.50
Railroad malleable	21.50 to 22.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$20.50 to \$21.00
No. 2 hvy. mltng. steel.	18.50 to 19.00
Hydraulic bund., new.	20.50 to 21.00
Hydraulic bund., old.	17.00 to 17.50
Steel rails for rolling	23.00 to 23.50
Cast iron carwheels	21.00 to 21.50
Hvy. breakable cast.	20.00 to 20.50
No. 1 cast	22.00 to 22.50
Stove plate (steel wks)	17.00 to 17.50
Railroad malleable	22.00
Machine shop turn.	13.50 to 14.00
No. 1 blast furnace	12.50 to 13.00
Cast borings	12.50 to 13.00
Heavy axle turnings	16.00 to 16.50
No. 1 low phos. hvy.	25.50 to 26.00
Couplers & knuckles	26.00
Rolled steel wheels	26.00
Steel axles	24.50 to 25.00
Shafting	24.50 to 25.00
Spec. iron & steel pipe	17.00 to 17.50
No. 1 forge fire	16.50 to 17.00
Cast borings. (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel	\$17.00 to \$17.50
Auto. hvy. mltng. steel	
alloy free	16.00 to 16.50
No. 2 auto steel	13.00 to 13.50
Shoveling steel	17.00 to 17.50
Factory bundles	16.50 to 17.00
Dealers' bundles	15.50 to 16.00
No. 1 busheling	16.00 to 16.50
No. 2 busheling, old.	7.00 to 7.50
Rolled carwheels	20.00 to 20.50
Railroad tires, cut	20.25 to 20.75
Railroad leaf springs	19.50 to 20.00
Steel coup. & knuckles	19.50 to 20.00
Axle turnings	16.00 to 16.50
Coil springs	20.50 to 21.00
Axle turn. (elec.)	18.00 to 18.50
Low phos. punchings	21.00 to 21.50
Low phos. plates 12 in. and under	20.50 to 21.00
Cast iron borings	9.50 to 10.00
Short shov. turn.	11.00 to 11.50
Machine shop turn.	9.50 to 10.00
Rerolling rails	20.00 to 20.50
Steel rails under 3 ft.	20.50 to 21.00
Steel rails under 2 ft.	21.00 to 21.50
Angle bars, steel	20.00 to 20.50
Cast iron carwheels	16.25 to 16.75
Railroad malleable	20.00 to 20.50
Agric. malleable	16.00 to 16.50

Per Net Ton

Iron car axles	22.75 to 23.25
Steel car axles	21.00 to 21.50
Locomotive tires	16.00 to 16.50
Pipes and flues	13.00 to 13.50
No. 1 machinery cast.	14.75 to 15.25
Clean auto. cast	15.00 to 15.50
No. 1 railroad cast.	14.25 to 14.75
No. 1 agric. cast.	12.50 to 13.00
Stove plate	11.00 to 11.50
Grate bars	11.00 to 11.50
Brake shoes	12.50 to 13.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$20.50 to \$21.00
No. 2 hvy. mltng. steel.	19.00 to 19.50
Low phos. plate	23.50 to 24.00
No. 1 busheling	19.50 to 20.00
Hydraulic bundles	20.00 to 20.50
Machine shop turn	12.50 to 13.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$19.00 to \$19.50
No. 2 hvy. mltng. steel.	18.00 to 18.50
Comp sheet steel	18.50 to 19.00
Light bund. stampings	15.50 to 16.00
Drop forge flashings	17.50 to 18.00
Machine shop turn.	12.00 to 12.50
Short shov. turn.	12.75 to 13.25
No. 1 busheling	18.25 to 18.75
Steel axle turnings	17.00 to 17.50
Low phos. billet and bloom crops	26.00 to 26.50
Cast iron borings	12.50 to 13.00
Mixed bor. & turn.	12.50 to 13.00
No. 2 busheling	12.50 to 13.00
No. 1 cupola cast	21.50 to 22.00
Railroad grate bars	14.50 to 15.00
Stove plate	14.50 to 15.00
Rails under 3 ft.	25.00 to 25.50
Rails for rolling	22.75 to 23.25
Railroad malleable	24.00 to 24.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$19.50 to \$20.00
No. 2 hvy. mltng. steel.	17.50 to 18.00
Scrap rails	20.00 to 20.50
New hvy. b'ndled sheets	17.50 to 18.00
Old hydraul. bundles	16.50 to 17.00
Drop forge flashings	17.50 to 18.00
No. 1 bushelings	17.50 to 18.00
Machine shop turn.	11.00 to 11.50
Shov. turnings	13.50 to 14.00
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Knuckles & couplers	23.00 to 24.00
Coil & leaf springs	23.00 to 24.00
Rolled steel wheels	23.00 to 24.00
No. 1 machinery cast.	19.00 to 19.50
No. 1 cupola cast.	18.00 to 18.50
Stove plate	15.50 to 16.00
Steel rails under 3 ft.	22.50 to 23.00
Cast iron carwheels	19.50 to 20.00
Railroad malleable	20.50 to 21.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	\$17.50 to \$18.00
No. 1 hvy. melting	16.00 to 16.50
No. 2 hvy. melting	15.00 to 15.50
No. 1 locomotive tires	18.00 to 18.50
Misc. stand. sec. rails	17.00 to 17.50
Railroad springs	20.50 to 21.00
Bundled sheets	12.00 to 12.50
No. 1 busheling	14.00 to 14.50
Cast bor. & turn.	7.00 to 7.50
Machine shop turn.	8.00 to 8.50
Heavy turnings	12.50 to 13.00
Rails for rolling	20.00 to 20.50
Steel car axles	21.50 to 22.00
No. 1 RR. wrought	12.50 to 13.00
No. 2 RR. wrought	16.25 to 16.75
Steel rails under 3 ft.	21.00 to 21.50
Steel angle bars	19.50 to 20.00
Cast iron carwheels	19.50 to 20.00
No. 1 machinery cast.	19.00 to 19.50
Railroad malleable	19.00 to 19.50
No. 1 railroad cast.	16.00 to 16.50
Stove plate	11.50 to 12.00
Grate bars	10.50 to 11.00
Brake shoes	12.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	\$15.00 to \$15.50
No. 2 hvy. mltng. steel.	13.00 to 13.50
Scrap rails for mltng.	19.50 to 20.00
Loose sheet clippings	10.50 to 11.00
Hydrau. b'ndled sheets	14.50 to 15.00
Cast iron borings	5.50 to 6.00
Machine shop turn.	6.50 to 7.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	4.50 to 5.00
Rails for rolling	20.50 to 21.00
No. 1 locomotive tires	16.50 to 17.00
Short rails	22.00 to 22.50
Cast iron carwheels	17.00 to 17.50
No. 1 machinery cast.	18.50 to 19.00
No. 1 railroad cast.	17.00 to 17.50
Burnt cast	9.75 to 10.25
Stove plate	9.75 to 10.25
Agricul. malleable	15.00 to 15.50
Railroad malleable	18.00 to 18.50
Mixed hvy. cast.	16.00 to 16.50

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	\$18.00
Scrap steel rails	20.00
Short shov. turnings	9.50
Stove plate	\$11.00 to 12.00
Steel axles	22.00
Iron axles	22.00
No. 1 RR. wrought	16.00
Rails for rolling	22.00 to 23.00
No. 1 cast	18.00
Tramcar wheels	18.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	\$15.50 to \$16.00
No. 2 hvy. mltng. steel	15.00 to 15.50
Borings and turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
Short shov. turnings	10.50 to 11.00
No. 1 machinery cast.	15.50 to 16.00
Automotive cast	17.00 to 17.50
Hvy. breakable cast.	12.50 to 13.00
Stove plate	10.50 to 11.00
Hydraul. comp. sheets	16.50 to 17.00
New factory bushel.	14.50 to 15.00
Sheet clippings	11.50 to 12.50
Flashings	14.00 to 14.50
Low phos. plate scrap	16.00 to 16.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	\$16.00 to \$16.50
No. 2 hvy. mltng. steel.	13.50 to 14.00
Hvy. breakable cast.	16.00 to 16.50
No. 1 machinery cast.	16.50 to 17.00
No. 2 cast	15.00 to 15.50
Stove plate	13.00 to 13.50
Steel car axles	19.00 to 20.00
Shafting	19.00 to 20.00
No. 1 RR. wrought	14.00 to 15.00
No. 1 wrought long	12.50 to 13.00
Spec. iron & steel pipe	13.50 to 14.00
Rails for rolling	19.00 to 20.00
Clean steel turnings*	9.00 to 10.00
Cast borings*	8.00 to 9.00
No. 1 blast furnace	8.00 to 9.00
Cast borings (chem.)	Nominal
Unprepared yard scrap	9.50 to 10.90
Light iron	5.00 to 5.50

Per gross ton delivered local foundries:

No. 1 machin. cast.	\$20.00 to \$22.00
No. 2 cast	18.50 to 19.00

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	\$14.25 to \$14.50
Machine shop turn.	8.25 to 8.65
Mixed bor. & turn.	6.50 to 6.75
Bun. skeleton long	11.50 to 11.75
Shafting	18.50 to 19.00
Stove plate	11.50
Cast bor. chemical	9.50 to 10.00

Per gross ton delivered consumers' yards:

Textile cast	\$18.00 to \$18.75
No. 1 machine cast	18.00 to 18.75

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	\$16.00
No. 2 steel	15.00

PACIFIC COAST

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	\$16.00 to \$17.50
No. 2 hvy. mltng. steel.	15.00 to 16.50

CANADA

Dealers' buying prices at these yards, per gross ton:

Toronto Montreal	
No. 1 hvy. mltng. steel.	\$11.25 to \$10.75
No. 2 hvy. mltng. steel.	10.00 to 9.50
Mixed dealers steel	9.25 to 8.75
Drop forge flashings	10.25 to 9.75
New loose clippings	7.00 to 6.00
Busheling	5.50 to 5.00
Scrap pipe	8.00 to 7.50
Steel turnings	6.25 to 5.50
Cast borings	5.75 to 5.00
Machinery cast	18.00 to 17.50
Dealers cast	17.00 to 16.50
Stove plate	12.00 to 11.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel.	\$15.50 to \$17.00
No. 2 hvy. mltng. steel.	14.00 to 16.00
No. 2 cast	14.50 to 15.00
Stove plate	13.00 to 14.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.	\$13.00
No. 2 hvy. mltng. steel.	17.00
Rails (scrap)	18.00
Stove plate	\$13.00 to 13.50
Philadelphia, delivered alongside boats, Port Richmond.	
No. 1 hvy. mltng. steel.	\$19.25 to \$19.50
No. 2 hvy. mltng. steel.	18.00 to 18.25

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling\$34.00
Forging quality 40.90

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton
Pittsburgh, Chicago or Cleveland\$43.00
Worcester, Mass. 45.00
Birmingham 43.00
San Francisco 52.00
Rods over 9/32 in. or 47/64 in., inclusive, \$5 a ton over base.

SOFT STEEL BARS

Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham 2.15c.
Detroit, delivered 2.25c.
Duluth 2.25c.
Philadelphia, delivered 2.47c.
New York 2.49c.
On cars dock Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham 2.15c.
On cars dock Tex. Gulf ports... 2.50c.
On cars dock Pacific ports 2.75c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports... 2.50c.
On cars dock Pacific ports 2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports... 2.50c.
On cars dock Pacific ports 2.50c.

IRON BARS

Chicago and Terre Haute 2.15c.
Pittsburgh (refined) 3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary 2.65c.
Detroit 2.70c.

* In quantities of 20,000 to 39,999 lb.

PLATES

Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c. to 2.35c.

Philadelphia, del'd 2.15c. to 2.40c.
New York, del'd 2.29c. to 2.54c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.60c.
Wrought iron plates, P'tg. 3.80c.

FLOOR PLATES

Pittsburgh or Chicago 3.35c.
New York, del'd 3.71c.
On cars dock Gulf ports 3.70c.
On cars dock Pacific ports 3.95c.

STRUCTURAL SHAPES

Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.70c.

STEEL SHEET PILING

Base per Lb.
Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Gulf ports 2.85c.
On cars dock Pacific ports 2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill
Standard rails, heavier than 60 lb., per gross ton\$40.00
Angle bars, per 100 lb. 2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton\$40.00
Light rails (from rail steel) per gross ton 39.00

Base per Lb.
Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast ports. 2.25c.
Track bolts, to steam railroads 4.15c.
Track bolts to jobbers, all sizes (per 100 counts) 65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago 2.00c.
Detroit, delivered 2.10c.
Philadelphia, delivered 2.17c.
Granite City 2.10c.
On cars dock Pacific ports 2.50c.
Wrought iron, Pittsburgh 4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago 3.05c.
Detroit, delivered 3.15c.
Granite City 3.15c.
Philadelphia, delivered 3.37c.
On cars dock Pacific ports 3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.
From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from \$4 to \$8 a ton were prevalent. Concessions withdrawn, on May 15.
Subsequent to May 15, many orders originally placed at \$4 to \$6 below the base price were adjusted to the full \$8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.67c.
Granite City 3.60c.
On cars dock Pacific ports 4.00c.
Wrought iron, Pittsburgh 6.10c.

Electrical Sheets (F.o.b. Pittsburgh)

Base per Lb.
Field grade 3.20c.
Armature 3.55c.

Electrical 4.05c.
Motor 4.95c.
Dynamo 5.65c.
Transformer 72 6.15c.
Transformer 65 7.15c.
Transformer 58 7.65c.
Transformer 52 8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Terns

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary 3.80c.
F.o.b. cars dock Pacific ports. 4.50c.

Vitreous Enameling Stock, 20 Gage*
Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland 3.35c.
Detroit, del'd 3.45c.
Granite City 3.45c.
On cars dock Pacific ports 3.95c.

TIN MILL PRODUCTS

*Tin Plate

Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary\$5.00
Standard cokes, Granite City... 5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Terns

Per Base Box
Granite City\$4.40
Pittsburgh or Gary 4.30

Roofing Terne Plate

(F.o.b. Pittsburgh per Package, 112 sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary 3.05c.
Granite City 3.15c.
On cars dock Pacific ports, boxed 4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.00c.
Detroit, delivered 2.10c.
On cars dock Pacific ports 2.60c.

Cooperage Stock

Pittsburgh & Chicago 2.10c.
From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15.
Subsequent to May 15, many orders originally placed at \$4 to \$6 below the base price were adjusted to the full \$8 concession.

COLD ROLLED STRIP*

Base per Lb.
Pittsburgh, Youngstown or Cleveland 2.80c.
Chicago 2.90c.
Detroit, delivered 2.90c.
Worcester 3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland 2.95c.
Detroit, delivered 3.05c.
Worcester 3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to \$4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

Pittsburgh and Cleveland Worcester
Carbon 0.26-0.50% 2.80c. 3.00c.
Carbon 0.51-0.75 4.30c. 4.50c.
Carbon 0.76-1.00 6.15c. 6.35c.
Carbon 1.01-1.25 8.35c. 8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.70

	Base per 100 Lb.
Annealed fence wire	\$2.90
Galvanized fence wire	3.30
Twisted barless wire	3.40
Woven wire fence, No. 11 and heavier, base col.	70
Woven wire fence, lighter than No. 11, base col.	67
Single loop bale ties, base col.	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool.	\$2.70
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool.	\$2.88

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Steel	Black Galv.	In.	Butt Weld	Wrought Iron	Black Galv.	In.
1/4	56	36	1/4	56	36	1/4
1/2	59	43 1/2	1/2	59	43 1/2	1/2
3/4	63 1/2	54	3/4	63 1/2	54	3/4
1	66 1/2	60 1/2	1	66 1/2	60 1/2	1
1 1/4	68 1/2	60 1/2	1 1/4	68 1/2	60 1/2	1 1/4

Lap Weld	2	2 1/2	3	3 1/2	4	5	6	7	8	9	10	11	12
2	61	52 1/2	54 1/2	55 1/2	57 1/2	58 1/2	59 1/2	60 1/2	61 1/2	62 1/2	63 1/2	64 1/2	65 1/2
2 1/2	64	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2
3	66	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2
3 1/2	68	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2
4	70	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2
5	72	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2
6	74	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2
7	76	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2
8	78	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2
9	80	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2
10	82	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2
11	84	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2
12	86	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2	99 1/2

Butt weld, extra strong, plain ends	1/4	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	3 1/2	4	5	6	7	8	9	10	11	12
1/4	54 1/2	41 1/2	43 1/2	45 1/2	47 1/2	49 1/2	51 1/2	53 1/2	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2
1/2	56 1/2	43 1/2	45 1/2	47 1/2	49 1/2	51 1/2	53 1/2	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2
3/4	58 1/2	45 1/2	47 1/2	49 1/2	51 1/2	53 1/2	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2
1	60 1/2	47 1/2	49 1/2	51 1/2	53 1/2	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2
1 1/4	62 1/2	49 1/2	51 1/2	53 1/2	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2
1 1/2	64 1/2	51 1/2	53 1/2	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2
1 3/4	66 1/2	53 1/2	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2
2	68 1/2	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2
2 1/2	70 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2
3	72 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2
3 1/2	74 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2
4	76 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2	99 1/2
5	78 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2	99 1/2	101 1/2
6	80 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2	99 1/2	101 1/2	103 1/2
7	82 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2	99 1/2	101 1/2	103 1/2	105 1/2
8	84 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2	99 1/2	101 1/2	103 1/2	105 1/2	107 1/2
9	86 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2	99 1/2	101 1/2	103 1/2	105 1/2	107 1/2	109 1/2
10	88 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2	99 1/2	101 1/2	103 1/2	105 1/2	107 1/2	109 1/2	111 1/2
11	90 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2	99 1/2	101 1/2	103 1/2	105 1/2	107 1/2	109 1/2	111 1/2	113 1/2
12	92 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2	99 1/2	101 1/2	103 1/2	105 1/2	107 1/2	109 1/2	111 1/2	113 1/2	115 1/2

Lap weld, extra strong, plain ends	2	2 1/2	3	3 1/2	4	5	6	7	8	9	10	11	12
2	59	51 1/2	53 1/2	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2
2 1/2	61	53 1/2	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2
3	63	55 1/2	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2
3 1/2	65	57 1/2	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2
4	67	59 1/2	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2
5	69	61 1/2	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2
6	71	63 1/2	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2
7	73	65 1/2	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2
8	75	67 1/2	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2
9	77	69 1/2	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2
10	79	71 1/2	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2
11	81	73 1/2	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2
12	83	75 1/2	77 1/2	79 1/2	81 1/2	83 1/2	85 1/2	87 1/2	89 1/2	91 1/2	93 1/2	95 1/2	97 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less than carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless	Lap Weld
	Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G. \$ 9.01	7.82
1 1/4 in. o.d.	13 B.W.G. 10.67	9.26
1 1/2 in. o.d.	13 B.W.G. 11.70	10.22
1 3/4 in. o.d.	13 B.W.G. 13.42	11.64
2 in. o.d.	13 B.W.G. 15.03	13.04
2 1/4 in. o.d.	13 B.W.G. 16.76	14.54
2 1/2 in. o.d.	13 B.W.G. 18.45	16.01
2 3/4 in. o.d.	13 B.W.G. 20.21	17.54
3 in. o.d.	13 B.W.G. 21.42	18.59
3 1/4 in. o.d.	13 B.W.G. 22.48	19.50
3 1/2 in. o.d.	13 B.W.G. 23.37	20.42
3 3/4 in. o.d.	13 B.W.G. 25.20	22.04
4 in. o.d.	13 B.W.G. 27.04	23.66
4 1/4 in. o.d.	13 B.W.G. 28.04	24.66
4 1/2 in. o.d.	13 B.W.G. 29.04	25.66
4 3/4 in. o.d.	13 B.W.G. 30.04	26.66
5 in. o.d.	13 B.W.G. 31.04	27.66
5 1/4 in. o.d.	13 B.W.G. 32.04	28.66
5 1/2 in. o.d.	13 B.W.G. 33.04	29.66
5 3/4 in. o.d.	13 B.W.G. 34.04	30.66
6 in. o.d.	13 B.W.G. 35.04	31.66

Extras for less carload quantities:

40,000 lb. or ft. over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft.....	5%
20,000 lb. or ft. to 29,999 lb. or ft.....	10%
10,000 lb. or ft. to 19,999 lb. or ft.....	30%
5,000 lb. or ft. to 9,999 lb. or ft.....	30%
2,000 lb. or ft. to 4,999 lb. or ft.....	45%
Under 2,000 lb. or ft.....	65%

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown ..	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, delivered Cincinnati ..	23.06
Northern, delivered, Cincinnati ..	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.10 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown ..	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

Bessemer

F.o.b. Buffalo	\$24.00
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown ..	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo....\$28.50

Gray Forge

Valley or Pittsburgh furnace..\$22.50

Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.34

Canadian Pig Iron

Per Gross Ton

Foundry iron	\$27.50 base
Malleable	28.00 base
Basic	27.50 base

Toronto

Foundry iron	\$25.50 base
Malleable	26.00 base
Basic	25.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	Per Gross Ton
Domestic, 80% (carload).....	\$100.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%.....	\$32.00
Domestic, 26 to 28%.....	39.50

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	\$69.50*
50% (ton lots in 50 gal. bbl.)..	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)..	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio Per Gross Ton

10.00 to 10.50%.....	\$32.50
For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.	
For each unit of manganese over 2%, \$1 per ton additional.	
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.	

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$26.50
For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.	
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.	
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.	
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.	

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

8% carbon	\$98.00
2.50% carbon	103.00
2% carbon	108.00
1% carbon	118.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads....	\$2.00
Ferrotungsten, 100 lbs. and less	2.25
Ferrovandium, contract, per lb. contained V., delivered	\$2.70 to \$2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots ..	\$2.25†
Ferrocobaltitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville	\$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo. f.o.b. Langeloth, Pa.	80c.

* Spot prices are \$5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50%...\$5.25	
Old range, non-Bessemer, 51.50% 5.10	
Messabi, Bessemer, 51.50%.....	5.10
Messabi, non-Bessemer, 51.50% . 4.95	
High phosphorus, 51.50%	4.85

Foreign Ores*

C.I.F. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12c.
Iron, basic or foundry, Swedish, aver. 65% iron.....	11c.
Iron, basic or foundry, Russian, aver. 65% iron.....	Nominal
Man., Caucasian, washed 52%	44c.
Man., African, Indian, 44-48%	43c.
Man., African, Indian, 49-51%	45c.
Man., Brazilian, 46 to 48%	40c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered..\$23.00 to \$24.00	
Tungsten, domestic, scheelite delivered	25.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	\$17.00
Rhodesian, 45%	21.00
Rhodesian, 48%	25.00
Turkish, 48-49%	26.00
Turkish, 45-46%	23.00
Turkish, 40-41%	18.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	\$26.00
48-49%	25.00

* All foreign ore prices are nominal

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$22.00
Domestic, f.o.b. Ohio River landing barges	\$22.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines..\$20.00 to 22.00	
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	\$22.50 to \$23.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	\$31.60

FUEL OIL

Per Gal.

No. 2, f.o.b. Bayonne, N. J....	4.375c.
No. 6, f.o.b. Bayonne, N. J....	2.74c.
No. 5 Bur. Stds., del'd Chicago	3.25c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate, del'd Cleve'd.	5.375c.
No. 4 industrial, del'd Cleve'd.	5.125c.
No. 5 industrial, del'd Cleve'd.	4.25c.
No. 6 industrial, del'd Cleve'd.	4.00c.

COKE

Per Net Ton

Furnace, f.o.b. Connells-ville, Prompt	\$5.00 to \$5.50
Foundry, f.o.b. Connells-ville, Prompt	5.75 to 6.25
Foundry, by - product Chicago ovens	10.50
Foundry, by - product del'd New England....	12.50
Foundry, by - product del'd Newark or Jersey City	11.38 to 11.90
Foundry, by - product Philadelphia	11.13
Foundry, by - product delivered Cleveland ..	11.05
Foundry, by - product delivered Cincinnati ..	10.50
Foundry, Birmingham..	7.50
Foundry, by - product del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.40c.
Shapes	3.40c.
Soft steel bars and small shapes	3.35c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.75c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb. On reinforcing bars base applies to orders of less than one ton and includes switching and starting charge.

All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
*Plates, 1/4 in. and heavier	3.76c.
*Structural shapes	3.75c.
*Soft steel bars, round	3.84c.
Iron bars, Swed. char-coal	9.50c.
*Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.09c.
Flats up to 12 in. wide	4.09c.
Cold-rolled strip soft and quarter hard	3.51c.
*Hot-rolled strip, soft O.H.	3.96c.
*Hot-rolled sheets (8-30 ga.)	3.58c.
*Galv. sheets (24 ga.)	5.23c.
Long ternes (24 ga.)	5.90c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretcher leveled	5.10c.
SAE, 2300, hot-rolled	7.35c.
SAE, 3100, hot-rolled	5.90c.
SAE, 6100, hot-rolled annealed	8.75c.
SAE, 2300, cold-rolled	8.59c.
SAE, 3100, cold-rolled, annealed	8.19c.
*Floor plate, 1/4 in. and heavier	5.56c.
Standard tool steel	12.50c.
Wire, black, annealed	4.85c.
Wire, galv. (No. 9)	4.70c.
O. H. spring steel, flats	4.70c.
Common wire nails, per keg	3.50c.

* For lots 400 to 1999 lb.

**For lots less than 1500 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.50c.
Soft steel squares, hexagons, channels and Tees	3.65c.
Hot rolled strip	3.60c.
Floor plates	5.15c.
Hot rolled sheets	3.35c.
Galvanized sheets	4.85c.
Cold rolled sheets	4.30c.
Cold finished carbon bars	3.75c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.40c.
Structural shapes	3.58c.
Soft steel bars	3.25c.
Cold-fin. bars (1500 lb., over.)	3.75c.
Hot-rolled strip	3.50c.
Cold rolled sheets	4.55c.
Cold-finished strip	3.20c.
Galvanized sheets (No. 24)	4.72c.
Hot-rolled sheets	3.35c.
Floor plates, 3/16 in. and heavier	5.18c.
*Black ann'd wire, per 100 lb.	\$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.75
Hot rolled alloy steel (3100)	5.85c.
Cold rolled alloy steel (3115)	6.75c.

* For 5000 lb. or less.

Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lbs. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 400 to 1499 lb.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.47c.
Bars, soft steel (rounds and flats)	3.62c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.77c.
Cold fin. rounds, shafting, screw stock	4.02c.
Galv. sheets (24 ga.)	4.52c.
Hot rolled sheets	3.38c.
Galv. corrugated sheets, 24 ga. and heavier	4.57c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	3.85c.
Plates, 1/4 in. and heavier	3.85c.
Bars	3.88c.
Heavy hot rolled sheets	3.71c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.61c.
Galvanized sheets	4.61c.
Cold rolled sheets	4.71c.

The following quantity differentials apply: Less than 100 lb., plus \$1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

	Base per Lb.
Plates	3.62c.
Floor plates	5.25c.
Struc. shapes	3.40c.
Soft steel bars	3.35c.
Reinforcing bars (20,000 lb. or more)	2.15c.
Cold-fin. flats, squares, rounds, and hex.	3.65c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl., also sizes No. 8 to 30 ga.	3.35c.
Galv. sheets (24 ga.)	4.70c.
Bands and hoops	3.82c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	\$60.30
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.90
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (East-ern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Net per Ton
Standard f.o.b. Baltimore and Chester	\$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Net per Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.90

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	3.55c.
*Structural shapes	3.55c.
*Soft steel bars small shapes, iron bars (except bands)	3.35c.
†Reinforc. steel bars, square and deformed	2.76c.
Cold-finished steel bars	4.16c.
*Steel hoops	4.35c.
*Steel bands, No. 12 and 3/16 in. incl.	3.85c.
*Spring steel	5.00c.
*Hot-rolled anneal. sheets	3.55c.
†Galvanized sheets (No. 24)	4.93c.
*Diam. pat. floor plates, 1/4 in.	5.25c.

*For quantities between 400 and 1999 lb.

†For 10 bundles or over.

‡For one to five tons.

BIRMINGHAM

	Base per Lb.
Bars and bar shapes	3.50c.
Structural shapes and plates	3.55c.
Hot rolled sheets No. 10 ga.	3.35c.
Galvanized sheets No. 24 ga.	4.75c.
Strip	3.60c.
Reinforcing bars	3.50c.
Floor plates	5.88
Cold finished bars	4.43
Machine and carriage bolts	50 & 10 off list
Rivets (structural)	\$4.60 base

On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 1999 lb. All prices are f.o.b. consumer plant.

PACIFIC COAST

	San Francisco	Los Angeles	Seattle
Plates, tanks and U. M.	4.00c.	3.80c.	3.40c.
Shapes, standard	4.00c.	3.80c.	3.50c.
Soft steel bars	4.00c.	3.95c.	4.00c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports	2.525c.	open.	2.975c.
Hot-rolled sheets (No. 10)	3.75c.	4.00c.	3.70c.
Galv. sheets (No. 24 and lighter	5.15c.	5.00c.	4.75c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.00c.	4.75c.
Cold-finished steel			
Rounds	6.80c.	6.60c.	7.10c.
Squares and hexagons	8.05c.	7.85c.	7.10c.
Flats	8.55c.	8.35c.	8.10c.
Common wire nails—base per kegless carload	3.25c.	3.25c.	3.15c.

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

DETROIT

	Base per Lb.
Soft steel bars	3.33c.
Structural shapes	3.65c.
Plates	3.60c.
Floor plates	5.27c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.43c.
Cold-rolled sheets	4.50c.
*Galvanized sheets	4.53c.
Hot-rolled strip, under No. 12	3.68c.
Hot-rolled strip, No. 12 and over	3.43c.
Cold-finished bars	3.80c.
Cold-rolled strip	3.55c.
Hot-rolled alloy steel (SAE 3100 Series)	5.97c.
Cold-rolled alloy (SAE 2300)	8.45c.

Quantity extras apply to all items. *Price applies only in metropolitan Detroit.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Celanese Corp. of America, Inc., 180 Madison Avenue, New York, has approved plans for one-story addition to cellulose rayon mill at Amelle, near Cumberland, Md. Cost over \$150,000 with equipment.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Nov. 28 for springs (Circular 250), steel hand holders (Circular 265); until Nov. 29, steel cutter and boring bar holders (Circular 253), steel forgings for cold-working equipment (Circular 252), aluminum bronze castings (Circular 255), and malleable iron castings (Circular 256).

Ethyl Gasoline Corp., 405 Lexington Avenue, New York, plans expansion and improvements in branch plant at Baton Rouge, La., including new units for production of tetra-ethyl lead and other processed materials for anti-knock gasoline manufacture. Cost close to \$4,000,000 with machinery. Work will be carried out under direction of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., which also will operate certain divisions of plant.

New York Plumbers Specialties Co., Inc., 156-02 Liberty Avenue, Jamaica, L. I., has acquired property on Guinzburg Road near plant, for one-story building for storage and distribution, superstructure to begin soon.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 28 for one acid-proof steel pickling tank, rubber and brick-lined (Schedule 7793), quantity of resistors (Schedule 7783) for Brooklyn Navy Yard; upper and lower roller tracks and spare parts (Schedule 7763), motor-driven air compressors, with motors, controllers and spare parts (Schedule 7788) for Brooklyn and Philadelphia yards; until Dec. 1, 55,000 ft. of electric cable for arc welding (Schedule 7819) for Philadelphia yard.

International Paper Co., 220 East Forty-second Street, New York, has let general contract to Duplex Construction Co., Glens Falls, N. Y., for two-story addition to branch mill at Palmer, N. Y., used for production of writing papers, book and other stocks, to be 50 x 150 ft. Cost over \$60,000 with equipment.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Nov. 27 for 700 wrenches (Circular 165).

Condenser Service & Engineering Co., 310 Twelfth Street, Hoboken, N. J., has purchased former plant of Raritan Radiator Co., Raritan, N. J., consisting of 23 acres, improved with main one and multi-story building and two smaller structures, totaling about 42,000 sq. ft. of floor space. Property will be modernized for plant. Larger part of present plant will be removed to new location, where increased capacity will be carried out.

P. Ballantine & Sons, 57 Freeman Street, Newark, N. J., brewers, will begin superstructure soon for multi-story addition, for which general contract recently was let to Turner Construction Co., 430 Lexington Avenue, New York. Cost close to \$200,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Nov. 27 for 443,000 ft. of low brass wire, 0.064-in. diameter (Circular 702), copper wire nails and cement-coated sinker nails (Circular 708), one sulfurator and one ether still, both glass-lined (Circular 736); until Nov. 28 for 83,850 steel wire ferrules, tin or cadmium-plated (Circular 738), four motor-driven sensitive drilling machines (Circular 742), 124,000 bodies, formed of small machined pieces of aluminum tubing (Circular 737); until Nov. 29, smokeless powder macerating machine with driving equipment (Circular 747), motor-driven vacuum pump (Circular 745); until Dec. 1 for 500,000 fuze sockets for adapters and boosters (Circular 650).

Lycoming Mfg. Division of Aviation Mfg. Corp., Williamsport, Pa., aircraft engines and parts, plans one-story addition and improvements in present plant. Cost over \$50,000 with equipment. Main offices of parent company are at 420 Lexington Avenue, New York.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., plans expansion and improvements in branch plant at Edge Moor, Del., used for production of titanium pigments, titanium dioxide and kindred products. Cost over \$1,000,000 with equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Bridesburg, Philadelphia, asks bids until Nov. 28 for one four-spindle chucking machine (Circular 668).

Forged Carbides, Inc., recently organized to manufacture carbide wire drawing dies and carbide cutting tools, has leased a plant at 40-30 23rd Street, Long Island City, N. Y. In THE IRON AGE of Nov. 9 name of this company was incorrectly given as Forged Metal Carbide Corp.

◀ BUFFALO DISTRICT ▶

Swanson Machine Co., 59 Hopkins Avenue, Jamestown, N. Y., has let general contract to J. M. Benzinger, 121 West Fourth Street, for one-story addition, 65 x 100 ft. Cost close to \$50,000 with equipment. O. R. Johnson, Fenton Building, is architect.

Pratt & Letchworth Co., Inc., 189 Tonawanda Street, Buffalo, steel castings, has filed plans for one-story foundry addition. Cost close to \$40,000 with equipment.

Haloid Co., 6 Haloid Street, Rochester, N. Y., processed photographic papers, etc., has let general contract to Gorsline & Swan Construction Co., 96 Pearl Street, for one-story addition. Cost about \$40,000 with equipment.

◀ WASHINGTON DIST. ▶

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Nov. 27 for six bench-type buffers (Circular 292), bronze castings (Circular 296); until Dec. 1, one 4000-lb. industrial tractor crane (Circular 291).

Eastern Shore Public Service Co., Salisbury, Md., plans extensions and improvements in steam-electric generating station at Vienna, Md., with installation of new 7500-kw. turbine-generator unit and auxiliary equipment. Cost over \$600,000, including foundations for a second generating unit of like capacity later. Company is under direction of Utility Management Corp., 61 Broadway, New York. E. M. Gilbert Engineering Corp., 412 Washington Street, Reading, Pa., is consulting engineer.

Contracting Officer, Office of Chief of Engineers, Munitions Building, Washington, asks bids until Nov. 30 for one gasoline standard gage locomotive (Circular 53).

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 27 for one concrete-pumping machine (Schedule 3742), three lead-melting furnaces, capacity 450 lb., and three pouring pots (Schedule 3743); until Nov. 28, 12,000 ft. of copper wire cloth, four 2000-lb. each platform weighing scales, six 25-ton screw jacks, two pairs of cable reel jacks, 34 wood circular saws, 72 metal-cutting band saws, boiler punches, pressure and vacuum gages, etc. (Schedule 3734), 36,570 ft. of insulated power (copper) cable (Schedule 3747).

Newport News Shipbuilding & Dry Dock Corp., Newport News, Va., has let general contract to Harwood Construction Co., Newport News, for one-story addition for an apprentice school for plant operatives. Cost close to \$75,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 28 for one motor-driven turret punch press,

16-station (Schedule 7802) for Sewall's Point yard; two motor-driven wood band saws (Schedule 7773) for Carderock, Md.; dies, diestocks, threading sets and tap wrenches (Schedule 7750), axes, hammers, hatchets, sledges, etc. (Schedule 7681), files and rasps (Schedule 7745) for Eastern and Western yards.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for one 30-ton electric bridge crane for navy yard at Pearl Harbor, T. H. (Specifications 9575).

◀ SOUTH ATLANTIC ▶

Brunswick Pulp & Paper Co., Brunswick, Ga., plans expansion and improvements in sulphate pulp mill, including new units. Cost close to \$500,000 with equipment.

Public Works Officer, Naval Air Station, Pensacola, Fla., asks bids until Dec. 13 for new seaplane hangar with shop facilities (Specifications 9210).

John Deere Plow Co., Moline, Ill., agricultural implements and machinery, has let general contract to J. A. Jones Construction Co., 209 West Fourth Street, Charlotte, N. C., for one-story factory branch, storage and distributing plant on North Tryon Street, Charlotte. Cost close to \$45,000 with equipment.

Public Works Officer, Parris Island, S. C., Marine Corps Base, will take bids soon for 7500-gal. elevated steel tank and tower, and pumping equipment (Specifications 9532).

◀ NEW ENGLAND ▶

United Aircraft Corp., East Hartford, Conn., has let general contract to Edwin Moss & Son, 555 Grant Street, Bridgeport, Conn., for one-story addition to plant of its Vought-Sikorsky Division, Stratford, Conn., 61 x 163 ft. Cost over \$50,000 with equipment.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Nov. 27 for 29,000 hammer springs, 17,000 extractor springs, 24,000 clip latch springs, 28,000 cartridge ejector springs and 24,000 rear sight nutlock springs (Circular 174), parts for automatic rifles, caliber 0.30, and parts for machine guns, caliber 0.30 (Circular 162), bronze castings, and aluminum base alloy die castings (Circular 173); until Nov. 28, 25,000 compensating springs (Circular 167), gages, including contour, radius, check plug, etc. (Circular 179), three broaching hydraulic horizontal machines and three pullers (Circular 168), punches and dies (Circular 177).

Bryant Chucking Grinder Co., Springfield, Vt., grinding machines and parts, has let general contract to Austin Co., Cleveland, for one-story addition. Cost close to \$45,000 with equipment.

Armstrong Rubber Co., 475 Elm Street, West Haven, Conn., automobile tires and tubes, has asked bids on general contract for four-story addition, 100 x 180 ft. Cost about \$200,000 with machinery. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

◀ SOUTH CENTRAL ▶

International Harvester Co., 180 North Michigan Avenue, Chicago, has acquired 3-acre tract at Greenwood and Mansfield Roads, Shreveport, La., for new factory branch, storage and distributing plant for motor truck and farm machinery divisions. It will consist of one-story units, with machine and repair shops, service department and other mechanical divisions, warehouse, boiler plant and other structures. Work is scheduled to begin early next year. Cost over \$175,000 with equipment. Present Shreveport branch is at 1421 Texas Avenue; P. H. Baker is local manager.

Jackson Brewing Co., 620 Decatur Street, New Orleans, has let general contract to George J. Glover Co., Inc., Whitney Bank Building, for four-story addition for storage and distribution. Cost close to \$70,000 with equipment. Jens Braae-Jensen, American Bank Building, are consulting engineers.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Nov. 29 for 252,450 ft. of aluminum or copper cable for new transmission line between Wilson and Wheeler hydroelectric generating plants.

Municipal Airport Department, Memphis, Tenn., plans new steel hangar, 130 x 160 ft., with reconditioning and repair facilities. Cost about \$73,000 with equipment, of which \$37,218 is being secured through Federal aid.

◀ SOUTHWEST ▶

Alabama Pipe Co., 2800 Eighth Avenue North, Bessemer, Ala., cast iron pipe and fittings, has let contract to Hiram Elliott Construction Co., Pioneer Trust Building, Kansas City, Mo., for concrete piers and foundations for new plant on six-acre tract at North Kansas City, Mo., recently acquired. Work on superstructure will begin soon, to consist of one-story units, totaling 75,000 sq. ft. of floor space, including large foundry. Cost close to \$175,000 with equipment. Present plant will be removed to new location and capacity increased.

Blanton Co., 318 South Second Street, St. Louis, food products, will take bids soon on general contract for new plant on river front, comprising three one and two-story buildings, with power house, service and garage unit and other structures. Cost over \$350,000 with equipment. **W. J. Knight & Co.**, Wainwright Building, are engineers.

John Morrell & Co., foot of Quincy Street, Topeka, Kan., meat packers, have asked bids on general contract for six-story and basement addition, 100 x 150 ft., for expansion in lard refinery and other production departments. Cost over \$150,000 with equipment. **Henschien, Everds & Crombie**, 59 Van Buren Street, Chicago, are architects and engineers.

Lone Star Gasoline Co., 1915 Wood Street, Dallas, Tex., plans new recycling plant for extraction of gasoline from natural gas in Cayuga gas field, eastern Texas, with auxiliary units for distillate recovery and other production service. Cost close to \$200,000 with compressors, steel tanks and other equipment. Company is affiliated with Lone Star Gas Co., first noted address.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until Dec. 7 for wrenches, ratchet handles and six metal tool chests (Circular 26).

◀ WESTERN PA. DIST. ▶

Vulcan Detinning Co., Neville Island, Pittsburgh, has asked bids on general contract for one-story addition, 165 x 380 ft. Cost over \$100,000 with equipment. **Dravo Corp.**, 300 Penn Avenue, is engineer.

Westinghouse Electric & Mfg. Co., East Pittsburgh, plans one-story addition, 120 x 345 ft., to branch plant at 2519 Wilkens Avenue, Baltimore, used for production of radio apparatus and other electrical equipment. Cost close to \$100,000 with equipment.

Joy Mfg. Co., Franklin, Pa., conveying and loading machinery, parts, etc., has let contract to Holt, McConnell & Osburn, Canonsburg, Pa., for one-story addition, 90 x 180 ft. Cost close to \$50,000 with equipment.

◀ OHIO AND INDIANA ▶

Hudepohl Brewing Co., 40 East McMicken Avenue, Cincinnati, plans two and three-story addition, partly for new mechanical-bottling department. Cost over \$75,000 with equipment. **Felsberg & Gillespie**, Ingalls Building, are architects.

Thompson Products, Inc., 2196 Clarkwood Road, Cleveland, automotive equipment, valves, bolts, etc., plans one-story addition, about 33,000 sq. ft. of floor space. Cost close to \$100,000 with equipment.

Armor Metal Products Co., 3400 Beekman Street, Cincinnati, has let general contract to Hodge Construction Co., Chamber of Commerce Building, for one-story addition, 60 x 160 ft. Cost close to \$40,000 with equipment.

Hydraulic Press Mfg. Co., Lincoln Avenue, Mount Gilead, Ohio, has arranged for sale of

new stock issue of 60,000 shares, preferred and common stock, approximately \$500,000 of proceeds to be used for additions to plant and equipment.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Nov. 27 for two electric ovens, convection type and inside service chamber type respectively at least 60 x 30 x 48 in. (Circular 578), $\frac{3}{4}$ -yd. diesel engine, full revolving crawler type shovel (Circular 590), 6161 chain pliers, 8949 combination pliers, 1665 curved pliers, 9148 diagonal-cutting pliers, and 1038 flat nose pliers (Circular 580); until Nov. 28, eight hardness testing machines (Circular 603), 100 to 799 hydraulic units for fuel pump drive, each consisting of hydraulic motor, hydraulic generator and fuel pump drives (Circular 583); until Nov. 30, six arbor presses (Circular 609), 24-in. motor-driven horizontal universal shaper (Circular 599), bench-type turret lathe, 12-in. throat, hand-operated, with 12 punches and dies (Circular 605).

Youngstown Sheet & Tube Co., East Chicago, Ind., has let general contract to John Rahn, East Chicago, for two-story and basement metallurgical laboratory. Cost about \$100,000 with equipment.

◀ MICHIGAN DISTRICT ▶

Jarecki Machine & Tool Co., Grand Rapids, Mich., screw presses, grinders, etc., plans one-story addition. Cost close to \$40,000 with equipment. **Robinson, Campau & Crowe**, Grand Rapids, are architects.

Ford Motor Co., Dearborn, Mich., has approved plans for one-story addition to branch assembling works at 12600 South Torrence Avenue, Chicago, including extensions in power plant and improvements in present buildings. Cost about \$250,000 with machinery.

Studebaker Corp., 4250 West Jefferson Avenue, Detroit, has asked bids on general contract for one-story addition to plant No. 3 and improvements in present structure. Cost over \$50,000 with equipment. **Russell Engineering Corp.**, 607 Shelby Street, is engineer.

Lau Tool & Gauge Co., 1207 Wayburn Street, Detroit, tools and other mechanical products, will soon begin superstructure for one-story addition, for which general contract recently was let to Swink Construction Co., 6757 East McNichols Street.

◀ MIDDLE WEST ▶

Heinemann's Bakeries, Inc., 2316 West Foster Avenue, Chicago, has asked bids on general contract for one-story and basement baking plant at Chicago, Bryn Mawr and Wolcott Avenues, 150 x 200 ft. Cost over \$80,000 with traveling ovens, conveyors and other equipment.

Adams & Westlake Co., 319 West Ontario Street, Chicago, railway equipment and supplies, has let general contract to E. I. Leander, 228 North LaSalle Street, for modernization and improvements in plant at 300 West Ohio Street. Cost close to \$50,000 with equipment. **Graham, Anderson, Frobst & White**, 80 East Jackson Boulevard, are architects.

Northwest Paper Co., Cloquet, Minn., writing and other paper stocks, plans one-story addition, for which superstructure will begin in December. Cost about \$100,000 with equipment.

Bucyrus-Erie Co., South Milwaukee, cranes, excavators and other heavy machinery, has begun erection of one-story addition, 50 x 200 ft., for expansion in pattern shop. Cost close to \$40,000 with equipment.

Wisconsin Power & Light Co., Madison, Wis., has plans for addition to steam-electric generating plant at Sheboygan, Wis., with installation of new 30,000-kw. turbo-generator unit, boilers and auxiliary equipment. Cost about \$2,000,000 including transmission line extensions.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., asks bids until Nov. 27 for 36 universal joints and propeller shafts (Circular 379), copper alloy centrifugally-cast cored bars (Circular 396), fuel pump shafts, clamps, wrenches, connect-

ing rods, springs, gears, washers, pistons and other equipment (Circular 378), welding electrodes and rods (Circular 387), two hydraulic pumps, 2500-lb. pressure (Circular 397), seamless steel tubing (Circular 385).

Board of Water Commissioners, Red Wing, Minn., asks bids until Dec. 6 for standby electric equipment for municipal pumping station, including one 187-kva. electric alternator, motor, etc. **J. F. Enz** is city engineer.

Oilgear Co., Milwaukee, has started construction of a one-story addition, containing 8000 sq. ft. of floor space, to plant at 1403 West Bruce Street, to house welding, painting and shipping departments. Cost about \$40,000.

◀ PACIFIC COAST ▶

Vega Aircraft Corp., Burbank, Cal., airplanes and parts, has let general contract to Western Iron & Metal Co., 2500 Santa Fe Avenue, Los Angeles, for one-story addition for storage and distribution. Cost close to \$40,000 with equipment. **Hugo Eckart**, 800 East Eighth Street, Los Angeles, is architect.

Commanding Officer, Ordnance Department, Benica Arsenal, Benica, Cal., asks bids until Nov. 23 for one vertical, multiple-spindle, hand-feed drill press, with motor and control, and V-belt drive (Circular 29), tool and cutter grinder, with equipment and motor-drive (Circular 30), four motor-driven, floor-type buffers (Circular 28).

Dr. Pepper Bottling Co., 526 West Chevy Chase, Glendale, Cal., has asked bids on general contract for one and two-story mechanical-bottling plant, about 50,000 sq. ft. of floor space, at 5950 Avalon Boulevard, Los Angeles. Cost over \$75,000 with equipment. **Robert V. Derrah**, 9470 Santa Monica Boulevard, Los Angeles, is architect.

United Air Lines, Inc., 5959 South Cicero Street, Chicago, will ask bids soon on general contract for new headquarters buildings at new Portland-Columbia super-airport, Portland, with large steel hangar, machine and repair shops, office building and other structures. Cost about \$175,000 with equipment. **Albert Kahn, Inc.**, New Center Building, Detroit, is architect and engineer.

Public Works Officer, Puget Sound Navy Yard, Bremerton, Wash., asks bids until Nov. 28 for new seaplane hangar, machine and mechanical shops, storehouse and power plant at naval air station, Tongue Point, Ore. (Specifications 9482).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 28 for one 50-ton steel railroad flat car and 50-ton steel box car (Schedule 7726) for San Diego, Cal., naval air station; 10 2000-lb. motor-gear pneumatic hoists (Schedule 7716), two elevating machines, controls and spare parts (Schedule 7755); until Dec. 1, two motor-driven toolroom lathes (Schedule 7752) for Puget Sound yard; until Nov. 28, one gasoline engine power shovel (Schedule 7713); until Dec. 1, three 100,000-lb. steel box cars, three 100,000-lb. steel flat cars, underframe with steel floor (Schedule 7765) for Mare Island yard; one 14-in. motor-driven engine lathe (Schedule 7749) for Seattle yard.

◀ FOREIGN ▶

Wild Barfield Electric Furnaces, Ltd., Elecfurn Works, North Road, Holloway, London, electric furnaces and parts, has acquired large tract in another suburb of city for new plant, comprising several one-story units for parts production and assembling, heat-treating, storage and distribution. Cost over \$175,000 with equipment. Present works will be removed and consolidated at new location later.

Canadian National Railways, 360 McGill Street, Montreal, have asked bids on general contract for one-story addition to car construction and repair shops, for new wheel shop and certain coach repair service. Cost close to \$100,000 with equipment.

National Steel Car Corp., Kenilworth Street North, Hamilton, Ont., plans one-story addition to airplane works at Malton, Ont., for increase in parts and assembling departments. Cost close to \$180,000 with equipment.

THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... French buying sends foreign orders up sharply ... Gains also reported in domestic sales, with the greatest activity in the East ... Long deliveries affecting local sales at Chicago.

Sharp Gain in Foreign Buying; Domestic Orders Rise

CINCINNATI—The already crowded books of district machine tool concerns were swelled further during the past week by a brisk increase in foreign demand. In addition, domestic demand also increased but not in as great proportion as the export business. France has been most active currently, although the British buying continues to be very good. Lathes and milling machines were the recipients of the bulk of current business, although the heavier types of machines are not without substantial business. In recapitulating the current demand, one manufacturer indicated he had booked as much business in the past month as he normally looks for in a year's time. All manufacturers are reluctant to reveal exact quantity of tools on orders, but current business includes a number of multiple unit orders with one estimated to call for three hundred units. Production in the machinery market continues to run at full capacity with a large number of the companies now running full night forces. Limited labor supply of skilled men, however, continues to act as a deterrent on further plant expansion.

Sales Activity Being Maintained in Northern Ohio

CLEVELAND—Activity is well maintained in Ohio. The past week has revealed several fair sized expansion projects over the state, while production is being stepped up in consumer goods plants and idle facilities here and there are being prepared for resumption. Machine tool propositions are reported in Dayton, Akron, Mansfield, Canton and Youngstown. However, at Detroit and Toledo inquiries have slackened. It is likely that during late November and December some companies will spend the remainder of the year's appropriations for machine tools. One year ago there was considerable of this type of business, probably greater than the unspent balance today.

Thompson Products, Inc., has received its first production order for a new type non-pulsating fuel pump for aircraft engines from the United States Army Air Corps. The new pump, which will be used in army planes, was invented by W. H. Curtis of Dayton and developed by the company.

The used machinery market continues full of vigor in this vicinity. An English buyer in town last week reported great difficulty finding millers, and the few available were far from being cheap. It

is interesting to note that at a Jackson, Mich., auction last week, a Blomquist horizontal boring mill about 20 years old brought a price of around \$3,500. A No. 35 Landis horizontal boring machine yielded \$4,700 and an old No. 31 Lucas brought around \$3,850. Only a couple of the machines from the Jackson plant are reported coming to this district.

Lengthening Deliveries Slow Orders in Chicago District

CHICAGO—In the past week, orders for machine tools in this area, as reported by various sellers, declined in some cases, and were unchanged in others. In the former instance, lengthening deliveries were given as the primary cause for the smaller volume. It appears that business is not being lost to others, but is simply not being placed at the present time. Users of machine tools still seem as interested in new equipment as before, but some are becoming discouraged at the delivery dates quoted, and have resigned themselves to the further use of present machinery. Here and there, of

course, schedules at factories are such that certain sizes of certain machines are available in reasonable time, but these instances are much the exception. Sales of small tools are being maintained, the delivery situation as yet being no problem. The Rock Island Arsenal continues the most active single factor in this market.

Government Machine Tool Buying Still at High Level

BOSTON—For the Springfield, Mass., Armory the Government has purchased drilling machines from Leland-Gifford Co., Worcester, Mass., at \$1,537; a shaper at \$2,120, and geared head lathes at \$13,880 from the Hendey Machine Co., Torrington, Conn., and two grinders from Austin-Hastings Co., Cambridge, Mass., for \$7,292.

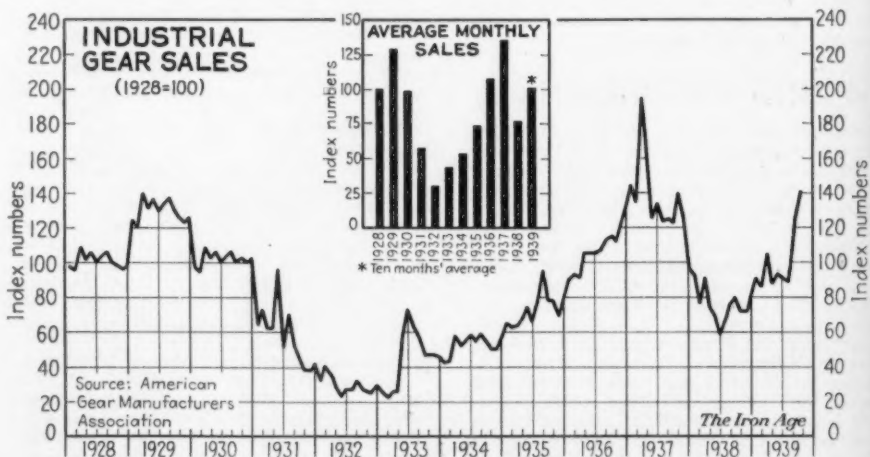
For the Watertown, Mass., Arsenal it is in the market for a double-end drilling and centering machine and four 12-in. precision engine lathes. For the Charlestown, Mass., Navy Yard it is in the market for radial drills, an upsetting-forging machine and two frame hydraulic bending presses of the horizontal table type; for the Newport, R. I., Torpedo Station one milling and one drilling machine; and for a plant not specified a gap squaring shear.

Other equipment recently purchased by the Government includes milling machines for \$24,718, and shapers for \$56,903 from the Pratt & Whitney division of Niles-Bement-Pond Co., Hartford; horizontal cutting and swaging machines from the Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn., for \$6,834; and milling machines from Brown & Sharpe Mfg. Co., Providence, for \$27,224.

October Gear Sales Almost Double Year Ago

Sales of industrial gears in October, reflecting the stepping up of industrial operations in that month, were 11 per cent above the September level and 95 per cent over October, 1938, the American Gear Manufacturers Association reports.

For the ten months ended October, this year, sales are 32 per cent higher than in the comparable period of 1938. Automotive gears are not included in these figures.



When Profit is Your Purpose

... THERE'S A DISSTON BITE-RITE
FILE TO DO EVERY JOB BETTER, FASTER

You know that knocking fins off castings, and smooth finishing of brass on lathe work require different kinds of files. But what you may not know today, is the tremendous variety of files made by Disston. Truly, there is "the correct file for every filing job," when your final purpose is profit.

In practically every standard shape for machine shop service, Disston Files are made in three different cuts: *Smooth Cut*, the finest; *Second Cut*, the next finest; and *Bastard*, coarse cut. Mill Files are also made in these cuts and in addition, a "MILL FINE BASTARD CUT."

You get the right file to do your job better, faster. And Disston Bite-Rite

Files give you these added advantages:

Teeth staggered like a harrow; cut, smooth, level at each stroke. Correct contour of cutting tip, rugged shoulders between the teeth.

And the Bite-Rite round, smooth, open gullet assures free, clear, clean discharge of chips . . . heavy, long, curling, like chips from a lathe tool.

Disston Engineering developed this file which combines speed of cut, long life and smoothness of filed surface.

Ask your Distributor of Disston Bite-Rite Files to help you choose the right shape and cut to speed up production, give better work. Henry Disston & Sons, Inc., Philadelphia.

BITE-RITE *New Disston File*



Arnold Hits Illegal Union Activities in Building Industry

WASHINGTON—Observers who were skeptical a few months ago when the Justice Department announced its intention to launch anti-trust proceedings against labor unions for alleged restraints in the building trades were mildly surprised early this week to hear Thurman Arnold, head of the Department's anti-trust division, take a further crack at the unions.

In a letter to the secretary of the Central Labor union of Indianapolis, the Administration's No. 1 trust buster went out of his way to clarify the Justice Department's attitude with respect to labor unions in the construction industry, insisting that he is prepared to crack down on what he called illegal union practices having "no reasonable connection with such legitimate objectives as wages, hours, safety, health, undue speeding up or the right of collective bargaining."

Reaction From Above?

What the reaction to Mr. Arnold's outspoken statement will be in higher Administration quarters, where matters involving possible alienation of labor have been handled gingerly in the past six years, is open to question, but some observers regarded the Arnold letter as the Justice Department's answer to recent claims advanced by the AFL and the CIO that trade unions are exempt from the anti-trust laws.

Listing boycotts, strikes or coercion by labor unions as likely to be subjected to Justice Department prosecution, Mr. Arnold specifically noted five types of "unreasonable restraints" which, in his opinion, are "unquestionable violations of the Sherman Act." These were:

1. Unreasonable restraints designed to prevent the use of cheaper material, improved equipment, or more efficient methods.
2. Unreasonable restraints designed to compel the hiring of useless and unnecessary labor.
3. Unreasonable restraints designed to enforce systems of graft and extortion as where "a racketeer, masquerading as a labor leader, interferes with the commerce of those who will not pay him to leave them alone."
4. Unreasonable restraints designed to enforce illegally fixed prices.
5. Unreasonable restraints designed

to destroy an established and legitimate system of collective bargaining.

Not Used In Strikes

"The anti-trust laws should not be used as an instrument to police strikes or adjudicate labor controversies," Mr. Arnold assured the Indianapolis labor representative. "The right of collective bargaining by labor unions is recognized by the anti-trust laws to be a reasonable exercise of collective power. Therefore, we wish to make it clear that it is only such boycotts, strikes or coercion by labor unions as have no reasonable connection with wages, hours, health, safety, the speed-

Klöckner Works to Build 2 New Stacks

HAMBURG—Luxembourgian steel production declined sharply in September and only 93,700 tons of iron was produced, as compared with 163,800 tons in August. In October production was up again probably to 80 per cent of August. Twelve furnaces were on blast on Sept. 15 as compared with 20 on Aug. 15 and 17 on Oct. 15.

The Klöckner works announced beginning of construction of two new blast furnaces and a new sheet, strip and tube mills. New ore mines (Porta district) are under development.

The Hermann Göring works started production of iron from two furnaces on Oct. 17, each of 800 tons daily capacity. A third goes into blast the second week of November, a fourth the first week of December, and the last three by the end of December or early in January, 1940. All are of 800-900 tons' daily capacity.

The German locomotive works have an order for delivery of all locomotives and railway cars for 1940-41 for Bulgaria, including nine express locomotives. The Rumanian Railways have also placed their whole equipment program with German companies, mainly Henschel and Krupp.

The German iron ore shipments from Sweden were resumed the second week of October from Narvik, the Norwegian port on the West Coast. The vessels go along the Norwegian west coast to Emden-Hamburg and so far—it is claimed—none of the vessels has been intercepted in-

up system, or the establishment and maintenance of the right of collective bargaining which will be prosecuted."

No Choice for Government

The Justice Department has no choice in the matter, Mr. Arnold asserted, explaining that such practices even go beyond the dissenting opinions of the Supreme Court which he said recognize a broader scope for the legitimate activities of labor unions than the majority opinions. He said in his letter that unions stand to gain by Department of Justice action in the current building investigation because the presentation of argument, instead of being "in the hands of those who may be hostile to organized labor," is being handled by "officials with a public duty to be fair, consistent, and constructive."

stead of the large ore steamers, smaller ones are used.

The latest steel export prices are as follows: Steel bars unaltered between £6 and £6 10s (gold), but joists advanced to £6 12s 6d; angles, 3 in., £6 12s 6d; 2 in., £7; heavy steel plates, Thomas quality, £7 5s-£7 10s; hot rolled hoops, ¼ in., £7 10s; ship plates, S.M., £9 10s (gold) f.o.b. This is of importance mainly for Belgian exporters, the Germans continuing to sell chiefly on clearing basis. The German steel cartel does not reveal export figures, but reports that "iron shipments" in October were above August, while steel sales are about 70-80 per cent of the normal shipment figures. Russia has bought 17,000 tons of sheets and 5200 tons of tool and alloy steels.

Sweden consumed 100,300 tons of iron and steel in September, as compared with 78,800 tons in September, 1938. A further advance has been reported for October. Export prices, which were advanced by 25 per cent in October, have been again advanced by 9 per cent, but the total volume of export orders is still comparatively small.

United Engineering Lets Shop Extension Contract

YOUNGSTOWN—United Engineering & Foundry Co. has let a contract for shop extensions here. This latest addition is an extension to the original project which was started a few months ago and which called for expansion of major plant facilities.

PRODUCTS INDEX

BILLETS—Forging

Alan Wood Steel Co., Conshohocken, Pa.
Andrew Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Re-rolling

Alan Wood Steel Co., Conshohocken, Pa.
Andrew Steel Co., The, Newport, Ky.

BILLETS—Steel

Bethlehem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Harrisburg (Pa.) Steel Corp.
Jones & Laughlin Steel Corp., Pittsburgh.
Tennessee Coal, Iron & Railroad Co.
(U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BLANKS—Chisel

Cleveland (Ohio) Punch & Shear Works Co., The.
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

BLANKS—Gear, Silent Steel

Waldron, John, Corp., New Brunswick, N. J.

BLAST CLEANING EQUIPMENT

American Foundry Equipment Co., The, 510 S. Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES

Brassart, H. A. & Co., Chicago, Ill.

BLAST GATES

Rockwell, W. S. Co., 50 Church St., N.Y.C.

BLOCKS—Chain

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS

American Blower Corp., 6000 Russell St., Detroit.
Buffalo (N. Y.) Forge Co., 492 Broadway.

BLOWPIPES—Oxy-Acetylene Welding & Cutting

Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

BLOWPIPES — Soldering, Heating, Annealing

American Gas Furnace Co., Elizabeth, N. J.

BOILERS—Waste Heat

Babecek & Wilcox Co., The, 35 Liberty St., N. Y. C.

BOILERS—Water Tube

Babecek & Wilcox Co., The, 35 Liberty St., N. Y. C.

BOLT CUTTERS

Landis Mch. Co., Inc., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.

BOLT AND NUT MACHINERY

Ajax Mfg. Co., The, Cleveland, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.
Waterbury (Ct.) Farrel Fdry. & Mch Co., The.

BOLT & RIVET CLIPPERS

Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine

Cleveland (Ohio) Cap Screw Co., The.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOLTS—Special

Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS—Stove

Progressive Mfg. Co., Torrington, Conn.

BOLTS—Stove, Recessed Head

American Screw Co., Providence, R. I.

BOLTS—Track

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BOLTS AND NUTS

American Screw Co., Providence, R. I.
Clark Bros. Bolt Co., Milldale, Conn.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOND—Grinding Wheel

Bakelite Corp., 247 Park Ave., New York City.

BORING BARS

Bullard Co., The, Bridgeport, Conn.
Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.
Gisholt Machine Co., Madison, Wisconsin.

BORING, DRILLING & MILLING MACHINES—Horizontal

Giddings & Lewis Machine Tool Co., Fond Du Lac, Wisc.
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond, Ind.

BORING & DRILLING MACHINES—Vertical

Baker Bros., Inc., Toledo, Ohio.
Bullard Co., The, Bridgeport, Conn.

BORING MACHINES—Diamond & Carbide Tools

Heald Machine Co., Worcester, Mass.

BORING MACHINES—Jig

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BORING MACHINES—Precision

Cimatool Co., The, Dayton, Ohio.

BORING & TURNING MILLS—Vertical

Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.

BRAKE LINING & BLOCKS—Asbestos

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan Inc., The, 2 Townsend St., Passaic, N. J.

BRAKES—Electric

Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
Kiekhaefer Corp., Cedarburg, Wisc.

BRAKES—Electric & Mechanical

Clark Controller Co., The, Cleveland.
Electric Controller & Mfg. Co., The, Cleveland.

BRAKES—Magnetic

Kiekhaefer Corp., Cedarburg, Wisc.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

BRAKES—Metal Forming

Bryant Machinery & Engineering Co., Chicago.
Cincinnati (Ohio) Shaper Co., The.
Cleveland Crane & Engineering Co., The.
Steelweld Machinery Div., Wickliffe, Ohio.

Drels & Krump Mfg. Co., Chicago.

Ferracute Machine Co., Bridgeton, N. J.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BRICK—Fire Clay

Carborundum Co., The, Niagara Falls, N. Y.
Illinois Clay Products Co., Joliet, Ill.

BRICK—Insulating

Babecek & Wilcox Co., The, 35 Liberty St., N. Y. C.

BRIDGE BUILDERS

American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable

Earle Gear & Mch. Co., Philadelphia.

BRIQUETS—Ferroalloy

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

BROACHES

American Broach & Machine Co., Ann Arbor, Mich.
Colonial Broach Co., Detroit.

BROACHING MACHINES

American Broach & Machine Co., Ann Arbor, Mich.
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Colonial Broach Co., Detroit.
Lucas Machine Tool Co., Cleveland.
Oliver Co., The, 1311 W. Bruce St., Milwaukee.

BRONZE FOR DIES

Ameco Metal, Inc., Milwaukee, Wisc.

BRONZE—Phosphor

Bunting Brass & Bronze Co., Toledo, Ohio.

BRUSHES—Machine

Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BRUSHES—Wire

Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BUCKETS—Clamshell

Blaw-Knox Div. of Blaw-Knox Co., Pittsburgh, Pa.

Cullen-Friedstedt Co., 1303 S. Kilbourn Ave., Chicago.

Hayward Co., The, 50 Church St., N. Y. C.

Heyl & Patterson, Inc., Pittsburgh.

Industrial Brownhoist Corp., Bay City, Mich.

Wellman Engineering Co., The, Cleveland.

BUCKETS—Electric Motor

Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Orange Peel

Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES

Packer Machine Co., The, Meriden, Conn.

BUFFING APPLICATORS—Automatic

Packer Machine Co., The, Meriden, Conn.

BUFFING COMPOUND — Stainless & Other Steels

Harrison & Co., Haverhill, Mass.

BUILDINGS—Steel

American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

American Rolling Mill Co., Middletown, Ohio.

Belmont Iron Works, Philadelphia.

Blaw-Knox Div. of Blaw-Knox Co., Pittsburgh, Pa.

Iron & Steel Products, Inc., Chicago.

BULLDOZERS

Ajax Mfg. Co., The, Cleveland, Ohio.

Cleveland Crane & Engineering Co., The.

Steelweld Machinery Div., Wickliffe, Ohio.

JUST BETWEEN US TWO

Air Wave Orchid

This exciting announcement will be aired tomorrow night at 7:15 P.M. E.S.T. by Albert Mitchell, WOR's "The Answer Man":

"The Iron Age, trade paper of the metal working industry, carries more advertisements than any other magazine in the world. But the Saturday Evening Post has a greater total income from advertising, and so is generally classed as the American magazine that leads in advertising."

We are grateful for the plug, and if it did not smack of looking a gift horse in the teeth on Thanksgiving Day of all days, we would suggest timidly that space is at least as good a gage as dollars in determining "the magazine that leads in advertising."

Not that we have anything against the Satevepost. We frequently boast of the fact that the combined circulation of that magazine and your favorite family journal exceeds three million.

They Laughed When . . .

At lunch the other day one of the editors declared that some airplanes can attain a height of five miles within six minutes. Everybody laughed, including ourself. We looked it up in an aircraft book and find that he is right. We also found that the chief engineer of the Stearman aircraft plant in Wichita, Kansas, is H. W. Zipp.

The English and the British Make a Deal

It would be rash to infer that any major change in the Soviet front as to the war is pending, especially in view of Mr. Litvinoff's distrust of the Anglo-British pact at Munich.—*New York Times.*

Now if the Nazis and the Germans would only get together.

She Does It the Hard Way

The war photographs the English have been feeding the press in this country strike us so far as rather piddling, which is surprising, considering that England doubtless abounds in experts in public relations.

The pictures are too obviously posed, and too little pains are taken to make them even moderately credible. We have before us, for example, a photo of a lady in the British Auxiliary Transport Service. She is changing a wheel on an automobile. We can tolerate the three too carefully placed smudges on her pretty face, as contrasted with lilywhite, well-manicured hands, but what insults our intelligence is that she is lying under the car and reaching awkwardly outside to loosen the nuts on the wheel bolts.

Of course, she might be a claustrophile, but if she is they ought to say so.

Lingerie Department

Bill (Armco) McFee's nostalgic letter about bloomers brought two wistful and anonymous comments, one from Dayton, O., and the other from Chicago. We thank both senders and regret that the narrow-mindedness of the postal authorities prevents us from letting the 18 loyal readers of this column share our enjoyment.

Portsiders' Champion

Although there must be at least one left-handed golfer to every 50 who slice to the right, we had never seen a southpaw illustrated in an ad until last week, in the Phillips Screw ad on page 129 of the Nov. 16 issue.

We congratulate Phillips on having the courage to break a tradition and upon winning high honors in the National Industrial Advertisers Association's contest for the best advertising campaigns of the year.

Puzzles

The brigades in last week's quaint army division had 5670, 6615, 3240, 2730 and 2772 men.

According to Cajori's *History of Elementary Mathematics* Diophantus had this epitaph:

He was a child for one-sixth of his life, a youth for one-twelfth, and a bachelor for one-seventh; five years after his marriage a son was born who lived one-half as long as his father and who died four years before his father.

If one of the master minds will work out the answer in a hurry and rush it in we will be able to tell a palpitating world in next week's issue how old Diophantus was when he died.

—A.H.D.

PRODUCTS INDEX

BURNERS—Oil or Gas
American Gas Furnace Co., Elizabeth, N. J.

BURNISHING MACHINES—Gear
Cimatool Co., The, Dayton, Ohio.

BURRING MACHINES
Cimatool Co., The, Dayton, Ohio.

BUSHINGS—Bronze
Ameco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Shenango-Penn Mold Co., Dover, Ohio.

BUSHINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BUSHINGS—Phosphor Bronze
Bunting Brass & Bronze Co., Toledo, Ohio.

BY-PRODUCTS COKE AND GAS PLANTS
Koppers Co., Engineering & Construction Div., Pittsburgh.

CABINETS—Tool & Parts
Standard Steel Products Co., Poughkeepsie, N. Y.

CABLE—Electric
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Cleveland.

CABLEWAYS AND TRAMWAYS—See Tramways

CALCIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CARBID
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE—Boron
Norton Co., Worcester, Mass.

CARBIDES—Cemented
Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.

CARBURIZING—See Heat Treating

CARLOADERS
Clark Tractor Div., Clark Equipment Co., Battle Creek, Mich.

CARS—Railway
Iron & Steel Products, Inc., Chicago.

CARS—Industrial and Mining
Atlas Car & Mfg. Co., The, Cleveland.
Heyl & Patterson, Inc., Pittsburgh.

CASE HARDENING—See Heat Treating

CASTERS
Darnell Corp., Ltd., Long Beach, Calif.

CASTINGS—Acid or Heat Resisting
Ameco Metal, Inc., Milwaukee, Wis.
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Alloy Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Alloy Steel
Advance Foundry Co., The, Dayton, Ohio.
Detroit (Mich.) Alloy Steel Co.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Michiana Products Corp., Michigan City, Ind.

CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Brass, Bronze, Copper or Aluminum
Bunting Brass & Bronze Co., The, Toledo, Ohio.

CASTINGS—Bronze
Cadman, A. W., Mfg. Co., Pittsburgh.
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Corrosion Resisting
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Die
Titan Metal Mfg. Co., Bellefonte, Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Electric Steel
Continental Roll & Steel Foundry Co., East Chicago, Ind.

Crucible Steel Castings Co., Lansdowne, Pa.
Detroit (Mich.) Alloy Steel Co.
Lebanon (Pa.) Steel Foundry.
National-Erie Corp., Erie, Pa.
Ohio Steel Foundry Co., Lima, Ohio.

CASTINGS—Gray Iron
Advance Foundry Co., The, Dayton, Ohio.
American Engineering Co., Philadelphia.
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—High Test & Alloy Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Magnesium Alloys
American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.

CASTINGS—Malleable
Canton (Ohio) Malleable Iron Co., The.
Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland.

CASTINGS—Monel & Nickel
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Semi-Steel
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Steel
American Rolling Mill Co., Middletown, Ohio.
Bethlehem (Pa.) Steel Company.
Birdsboro (Pa.) Steel Foundry & Machine Co.

CASTINGS—Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Continental Roll & Steel Foundry Co., East Chicago, Ind.

CASTINGS—Steel
Crucible Steel Castings Co., Lansdowne, Pa.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
Michiana Products Corp., Michigan City, Ind.

CASTINGS—Steel
National-Erie Corp., Erie, Pa.
Ohio Steel Foundry Co., Lima, Ohio.
Standard Steel Wks. Co., Phila., Pa.
Steel Founders' Society of America, Cleveland.

CASTINGS—Steel
Strong Steel Foundry Co., Buffalo, N. Y.

CEMENT—Acid-Proof
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CEMENT—Polishing Wheel
Harrison & Co., Haverhill, Mass.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.
John-Manville Corp., 22 East 40th St., New York City.

CEMENT—Rubber
Goodrich, B. F. Co., The, Akron, Ohio.

CENTERING MACHINES
Hendey Machine Co., Torrington, Conn.
Sundstrand Machine Tool Co., Rockford, Ill.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Div. of Chain Belt Co., Springfield, Mass.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Div. of Chain Belt Co., Springfield, Mass.

CHAINS—Power Transmission
Baldwin-Duckworth Div. of Chain Belt Co., Springfield, Mass.

CHAINS—Roller
Baldwin-Duckworth Div. of Chain Belt Co., Springfield, Mass.

CHAINS—Silent
Link-Belt Co., 519 North Holmes Ave., Indianapolis, Ind.

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CHEMICALS—Industrial
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CHEMICALS—Rust Proofing
Alrore Chemical Co., Cranston, Providence, R. I.

CHEMICALS—Rust Proofing
Parker Rust Proof Co., 2186 Milwaukee Ave., Detroit.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHROMIUM — Plating — See Plating — Chromium

CHRONOGRAPHS
Stillman, M. J., Co., Inc., Chicago.

CHUCKING MACHINES—Automatic
New Britain-Gridley Machine Div., The New Britain Machine Co., New Britain, Conn.

CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.
Goss & DeLeeuw Machine Co., New Britain, Conn.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The.
Bedford, Mass.

CHUCKS—Magnetic
Brown & Sharpe Mfg. Co., Providence, R. I.

CHUCKS—Magnetic
Heald Machine Co., Worcester, Mass.
Taft-Peire Mfg. Co., The, Woonsocket, R. I.

CLAMPS—Cable Strain
Efficiency Electric & Mfg. Co., East Palestine, Ohio.

CLAMPS—Rail Booster
Efficiency Electric & Mfg. Co., East Palestine, Ohio.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Ford, J. B., Sales Co., The, Wyandotte, Mich.

CLEANING COMPOUNDS—Alkali
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CLEANING EQUIPMENT (METAL)—Electro-Chemical
Bullard Co., The, Bridgeport, Conn.

CLUTCH-BRAKES—Magnetic
Kiekhafer Corp., Cedarburg, Wis.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

CLUTCHES
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.

CLUTCHES
Foote Bros. Gear & Machine Co., 5301-H So. Western Blvd., Chicago, Ill.

CLUTCHES—Friction
Dodge Mfg. Corp., Mishawaka, Ind.
Twin Disc Clutch Co., Racine, Wis.

CLUTCHES—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., 727 Smith St., Milwaukee.

CLUTCHES—Magnetic
Kiekhafer Corp., Cedarburg, Wis.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

COAL
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.

COAL
Koppers Coal Co., The, Pittsburgh.
Pickands Mather & Co., Cleveland.
Suzugilexport, Kallavskaja Ulitsa 5, Moscow 6, U. S. S. R.

COAL ORE & ASH HANDLING MACHINERY
Heyl & Patterson, Inc., Pittsburgh.
Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

COBALT METAL
Central Trading Corp., 511 Fifth Ave., N. Y. C.

COILS—Lead
National Lead Co., 111 Bldg., N. Y. C.

COILS—Pipe
Harrisburg (Pa.) Steel Corp.

COKE—Metallurgical
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Co., Engineering & Construction Div., Pittsburgh.

COLD ROLL FORMING MACHINES
McKay Machine Co., The, Youngstown, Ohio.

COLLETS
Rivett Lathe & Grinder, Inc., Boston, Mass.

COLUMBIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

COMBUSTION CONTROLS
Brown Instrument Co., The, Philadelphia.
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

COMBUSTION CONTROLS
Morgan Construction Co., Worcester, Mass.

COMPOUNDS—Drawing
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

COMPOUNDS—Drawing
Penola, Inc., Pittsburgh.
Standard Oil Co. (Indiana), Chicago.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

COMPRESSORS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

COMPRESSORS—Air
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Gas
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

CONDENSERS—Surface & Jet
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CONDUITS—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

CONTACTS—Electrical
Mallory, P. R., & Co., Inc., Indianapolis, Ind.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

CONTROLLERS—Crane
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.

CONTROLLERS—Electric
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.

CONTROLLERS—Electric
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Valve, Electrically Operated
Brown Instrument Co., The, Philadelphia.
Cutler-Hammer, Inc., Milwaukee.
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

CONTROLS—Time Cycle
Koppers Co., Bartlett Hayward Div., Baltimore, Md.

CONVEYING AND ELEVATING MACHINERY
Farquhar, A. B., Co., Ltd., York, Pa.
Heyl & Patterson, Inc., Pittsburgh.
Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

CONVEYOR WORMS
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

CONVEYORS—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

CONVEYORS—Portable
Farquhar, A. B., Co., Ltd., York, Pa.

COPING MACHINES
Cleveland (Ohio) Punch & Shear Works Co., The.

COPING MACHINES
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

CORE OIL
Penola, Inc., Pittsburgh.
Sun Oil Co., Philadelphia.

CORE OIL
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS—See Grinding Wheels

COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valles Falls, R. I.
Hubbard, M. D., Spring Co., 749 Central Ave., Pontiac, Mich.

COUNTERBORES
Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.

COUNTERBORES
Cleveland (Ohio) Twist Drill Co., The.
Gairing Tool Co., Detroit.

COUNTERBORES
Morse Twist Drill & Mch. Co., New Bedford, Mass.

COUNTERS—Production
Streeter-Amet Co., Chicago.
Veeder-Root, Inc., Hartford, Ct.

COUNTING MACHINES
Veeder-Root, Inc., Hartford, Conn.

COUPLINGS—Cut-off Friction
Foote Bros. Gear & Machine Co., 5301-H So. Western Blvd., Chicago, Ill.

COUPLINGS—Flexible
Crocker-Wheeler Electric Mfg. Co., Amherst, N. J.

COUPLINGS—Flexible
Koppers Co., Bartlett Hayward Div., Baltimore, Md.

COUPLINGS—Pipe
Champion Machine & Forging Co., The, Cleveland, Ohio.

COUPLINGS—Pipe
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

CRANES—Crawling Tractor
American Hoist & Derrick Co., St. Paul, Minn.

CRANES—Crawling Tractor
Cullen-Friedest Co., 1303 S. Kilbourn Ave., Chicago.